

VOLUME II-B

**APPENDIX G
ENERGY CALCULATIONS**

**FEASIBILITY STUDY FOR INSTALLATION OF UMCS
FORT RILEY, KANSAS**

ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)

Prepared for

U.S. Army Corps of Engineers
Kansas City District
Kansas City, Missouri

Under

U.S. Army Engineer District, Mobile
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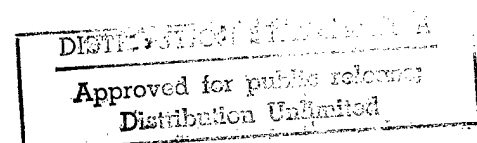
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December 1995

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By

EMC Engineers, Inc.
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DEPARTMENT OF THE ARMY
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS
P.O. BOX 9005
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Marie Wakefield,
Librarian Engineering

BUILDING 7610
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7610****BUILDING NAME: ENL BARRACKS W/AS**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	1.76	0.00	15.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.97	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	1.76	0.00	15.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.97	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

REGULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	60
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.66	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,050.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	50.49	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	51.15	1,050.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.61	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.61	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7610****BUILDING NAME: ENL BARRACKS W/AS**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7610**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7610

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7612
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7612****BUILDING NAME: ENL BARRACKS W/AS**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	1.76	0.00	15.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.97	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	1.76	0.00	15.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.97	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7612****BUILDING NAME: ENL BARRACKS W/AS****Building UA:** 15,201**CONDITIONED SQFT:** 41,892**SYSTEM INFORMATION**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612 BUILDING NAME: ENL BARRACKS W/AS
Building UA: 15,201 CONDITIONED SQFT: 41,892

SYSTEM INFORMATION	
System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION				
Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE							
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

THERMAL LOADS		
	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	59.83	1,225.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7612

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7612****BUILDING NAME: ENL BARRACKS W/AS**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7612**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7614
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7614**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	1.76	0.00	15.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.97	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	1.76	0.00	15.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.97	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAHC:	0
HOAOH:	0
COAHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

PERFORMANCE CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FNCTN NO	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	59.83	1,225.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.61	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.61	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7614**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7614

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7616
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616 BUILDING NAME: ENL BARRACKS W/AS
Building UA: 15,201 CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	1.76	0.00	15.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.97	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7616****BUILDING NAME: ENL BARRACKS W/AS**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.20	
Sub Total	1.76	0.00	15.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.97	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

REQUIREMENTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7616**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	59.83	1,225.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.61	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.61	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7616****BUILDING NAME: ENL BARRACKS W/AS**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7616****BUILDING NAME: ENL BARRACKS W/AS**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCIN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7616

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7616**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7618
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,201

CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7618****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,201

CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	10.99	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	10.99	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

LOAD CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7618****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7618

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	63.84	1,291.50	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

BUILDING 7620
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7620

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,427

CONDITIONED SQFT: 6,340

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,310
CFM-CLG:	6,310
%OA:	40%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760
CLG HRS SAVED:	2,420	
HTG HRS SAVED:	3,872	
C/H HRS SAVED:	6,309	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY:

BLDG: 7620

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,164.82	257.98	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	37,462.71	88.83	
Sub Total	7.46	65,742.88	346.81	
Economizer	0.00	1,229.39	0.00	
Ventilation/Recirculation	0.00	197.84	12.47	
DDC Control	0.00	3,603.11	73.05	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	70,773.22	432.33	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7620

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,427	CONDITIONED SQFT:	6,340
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760
CLG HRS SAVED:	2,420	
HTG HRS SAVED:	3,872	
C/H HRS SAVED:	6,309	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

BLDG: 7620

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,339.32	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	3,602.36	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	3,602.36	2.55	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7620

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,427

CONDITIONED SQFT: 6,340

SYSTEM INFORMATION

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	21
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760
CLG HRS SAVED:	2,420	
HTG HRS SAVED:	3,872	
C/H HRS SAVED:	6,309	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

BLDG: 7620

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	358.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	17.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	17.25	358.75	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

BUILDING 7622
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,949	CONDITIONED SQFT:	12,380
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,880
CFM-CLG:	3,880
%OA:	20%
%Area:	23%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,740.62	70.79	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	20,560.80	24.82	
Sub Total	3.12	30,768.14	95.62	
Economizer	0.00	965.04	0.00	
Ventilation/Recirculation	0.00	60.83	3.83	
DDC Control	0.00	2,828.35	20.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	3.12	34,622.36	119.87	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7622****BUILDING NAME: BN ADMIN & CLRM**

Building UA: 2,949

CONDITIONED SQFT: 12,380

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,780
CFM-CLG:	3,780
%OA:	25%
%Area:	23%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,985.21	86.21	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	20,030.88	24.82	
Sub Total	3.12	30,482.81	111.04	
Economizer	0.00	940.17	0.00	
Ventilation/Recirculation	0.00	74.07	4.67	
DDC Control	0.00	2,755.46	20.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	3.12	34,252.51	136.12	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,949

CONDITIONED SQFT: 12,380

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,155
CFM-CLG:	6,155
%OA:	20%
%Area:	27%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	22,374.96	112.30	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	32,616.42	29.14	
Sub Total	7.46	56,106.72	141.45	
Economizer	0.00	1,530.88	0.00	
Ventilation/Recirculation	0.00	96.49	6.08	
DDC Control	0.00	4,486.73	23.97	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	62,220.82	171.49	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,949	CONDITIONED SQFT:	12,380
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	27%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	900,000
BLR CAP OUTPUT (BTUH):	720,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,288.57	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	5,755.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.10	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	5,755.29	5.10	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,949	CONDITIONED SQFT:	12,380
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	45
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7622

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,895.27	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	5,586.50	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	787.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	37.87	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	39.60	6,374.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

BUILDING 7624
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/DEJ

ENERGY CALCULATION PARAMETERS**BLDG: 7624****BUILDING NAME: BN ADMIN & CLRM**

Building UA:	1,467	CONDITIONED SQFT:	6,158
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	10,353
CFM-CLG:	10,353
%OA:	13%
%Area:	72%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/DEJ

BLDG: 7624

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	36,763.72	139.84	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	62,482.12	38.66	
Sub Total	10.99	100,888.65	178.50	
Economizer	0.00	1,931.26	0.00	
Ventilation/Recirculation	0.00	105.50	6.65	
DDC Control	0.00	5,660.17	31.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	108,585.58	216.94	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/DEJ

ENERGY CALCULATION PARAMETERS

BLDG: 7624

BUILDING NAME: BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	387,000
BLR CAP OUTPUT (BTUH):	310,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/DEJ

BLDG: 7624

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,876.17	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.19	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	2,876.17	2.19	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

ENERGY CALCULATION PARAMETERS

BLDG: 7624

BUILDING NAME: BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

BLDG: 7624**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	25.25	525.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

**BUILDING 7626
CLINIC W/O BEDS**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7626

BUILDING NAME: CLINIC W/O BEDS

Building UA:	1,496	CONDITIONED SQFT:	3,604
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SYSTEM INFORMATION	
System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION				
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	10 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE							
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,230
CFM-CLG:	3,230
%OA:	20%
%Area:	80%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS		
	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7626

BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,827.64	207.99	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,962.36	43.08	
Sub Total	0.00	18,256.73	251.07	
Economizer	0.00	2,364.64	0.00	
Ventilation/Recirculation	0.00	238.41	9.89	
DDC Control	0.00	901.90	48.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	0.00	21,761.67	309.19	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7626

BUILDING NAME: CLINIC W/O BEDS

Building UA: 1,496

CONDITIONED SQFT: 3,604

SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	258,000
BLR CAP OUTPUT (BTUH):	206,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7626

BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,917.45	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.46	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	1,917.45	1.46	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7626****BUILDING NAME: CLINIC W/O BEDS**

Building UA:	1,496	CONDITIONED SQFT:	3,604
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effc:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	11
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7626

BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,764.43	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	4,231.16	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	185.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	8.92	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	10.09	4,416.66	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

BUILDING 7630
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7630

BUILDING NAME: BN ADMIN & CLRM

Building UA: 1,467

CONDITIONED SQFT: 6,158

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	10,353
CFM-CLG:	10,353
%OA:	13%
%Area:	72%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUHC:	0.000941
NSUC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7630

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	35,269.26	134.15	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	59,942.20	38.66	
Sub Total	10.99	96,854.27	172.81	
Economizer	0.00	2,145.84	0.00	
Ventilation/Recirculation	0.00	105.50	6.65	
DDC Control	0.00	6,289.08	31.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	105,394.69	211.25	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7630

BUILDING NAME: BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	387,000
BLR CAP OUTPUT (BTUH):	310,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7630**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,560.81	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,767.66	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.19	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	2,767.66	2.19	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7630

BUILDING NAME: BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7630**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	25.25	525.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

**BUILDING 7632
GYMNASIUM**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,128,750
BLR CAP OUTPUT (BTUH):	2,503,000

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

REQUIRED AND PRESENT HRS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7632**BUILDING NAME: GYMNASIUM****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	520,000

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HRS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7632

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7632

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.21	
Sub Total	0.00	295.53	155.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	295.53	156.80	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7632

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-2

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.21	
Sub Total	0.00	295.53	155.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	295.53	156.80	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7632**BUILDING NAME: GYMNASIUM****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	857.40	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	862.73	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7632

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	857.40	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	862.73	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA: 2,692

CONDITIONED SQFT: 20,694

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7632**BUILDING NAME: GYMNASIUM****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	857.40	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	862.73	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7632

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	857.40	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	862.73	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7632

BUILDING NAME: GYMNASIUM

Building UA: 2,692

CONDITIONED SQFT: 20,694

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7632

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	857.40	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	862.73	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

**BUILDING 7636
REGIMENTAL HQ BUILDING**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7636

BUILDING NAME: REGIMENTAL HQ BLDG

Building UA:	2,563	CONDITIONED SQFT:	9,850
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	825
CFM-CLG:	825
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN./CWW

BLDG: 7636**BUILDING NAME: REGIMENTAL HQ BLDG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,432.70	89.20	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	5,181.41	9.38	
Sub Total	0.92	9,752.01	98.58	
Economizer	0.00	136.80	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	400.93	7.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.92	10,289.74	106.30	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7636

BUILDING NAME: REGIMENTAL HQ BLDG

Building UA:	2,563	CONDITIONED SQFT:	9,850
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

BLDG: 7636

BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,989.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	1,989.79	2.55	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7636****BUILDING NAME: REGIMENTAL HQ BLDG**

Building UA:	2,563	CONDITIONED SQFT:	9,850
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN./CWW

BLDG: 7636

BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,361.57	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	10,476.91	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	521.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.08	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	27.87	10,998.41	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7636

BUILDING NAME: REGIMENTAL HQ BLDG

Building UA: 2,563

CONDITIONED SQFT: 9,850

SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.70
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	8,600
CFM-CLG:	8,600
%OA:	0%
%Area:	80%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760

CLG HRS SAVED:	2,560
HTG HRS SAVED:	4,096
C/H HRS SAVED:	6,674

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

BLDG: 7636**BUILDING NAME: REGIMENTAL HQ BLDG****ENERGY CALCULATION SUMMARY**

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,580.41	0.00	
Opt ST/SP	0.00	483.50	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	10,102.20	22.35	
Sub Total	0.00	21,166.11	22.35	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	21,166.11	22.35	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7636****BUILDING NAME: REGIMENTAL HQ BLDG**

Building UA:	2,563	CONDITIONED SQFT:	9,850
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN./CWW

BLDG: 7636

BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,772.77	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7638
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7638

BUILDING NAME: BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	10,353
CFM-CLG:	10,353
%OA:	13%
%Area:	72%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7638

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	35,269.26	134.15	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	59,942.20	38.66	
Sub Total	10.99	96,854.27	172.81	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	6,289.08	31.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	103,143.35	204.60	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7638

BUILDING NAME: BN ADMIN & CLRM

Building UA:	1,467	CONDITIONED SQFT:	6,158
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	387,000
BLR CAP OUTPUT (BTUH):	310,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7638**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,707.21	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,845.11	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.19	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	1,845.11	2.19	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7638****BUILDING NAME: BN ADMIN & CLRM****Building UA:** 1,467**CONDITIONED SQFT:** 6,158**SYSTEM INFORMATION**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7638

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	25.25	525.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

BUILDING 7642
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DCCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAF, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7642****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CVVV

ENERGY CALCULATION PARAMETERS

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	10.99	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7642**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	10.99	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,201

CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

CLIMATE ADJUSTMENTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7642

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	63.27	1,291.50	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

BUILDING 7644
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,201

CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	10.99	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7644****BUILDING NAME: ENL BARRACKS W/O DIN****Building UA: 15,201****CONDITIONED SQFT: 41,892****SYSTEM INFORMATION**

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	10.99	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7644**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,000

HEAT CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7644****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7644

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	63.84	1,291.50	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

BUILDING 7646
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7646****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7646****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TECHNICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	10.99	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7646**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	10.99	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7646****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5/BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,000

REPAIRS/REPLACEMENTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7646**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	84
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7646

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,470.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	70.69	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	72.42	1,470.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

BUILDING 7648
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	14.19	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	14.19	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	14.19	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	14.19	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,008,000
BLR CAP OUTPUT (BTUH):	1,606,400

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

REQUIREMENTS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	84
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,470.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	70.69	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	72.42	1,470.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,201

CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7648**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	HWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7648

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

BUILDING 7650
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTIN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,201

CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

PHYSICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,044
CFM-CLG:	5,044
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CVWW

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-4

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	7.46	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,456.71	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	2,456.71	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,201

CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5/BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	14.19	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	14.19	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

PHYSICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	6,900
CFM-CLG:	6,900
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	50.77	
Sub Total	14.19	0.00	50.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,360.69	86.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	14.19	3,360.69	136.83	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,201

CONDITIONED SQFT: 41,892

SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,000

OURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7650**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7650

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,201	CONDITIONED SQFT:	41,892
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7650**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	63.84	1,291.50	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

BUILDING 7652
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,753

CONDITIONED SQFT: 13,520

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	0.52	2,885.90	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	0.52	2,885.90	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCEN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	0.52	2,885.90	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7652****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7652**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	0.52	2,885.90	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	800,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7652**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.67	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	5.67	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,613.02	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	2,981.98	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	262.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.62	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	13.55	3,244.48	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7652

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,343.80	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,550.64	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,550.64	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7654
ENLISTED PERSONNEL DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN

BLDG: 7654

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,579.22	115.06	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,524.80	49.13	
Sub Total	7.46	14,219.37	164.19	
Economizer	0.00	3,767.82	0.00	
Ventilation/Recirculation	0.00	399.03	18.19	
DDC Control	0.00	8,606.70	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	26,992.92	201.71	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	4	1	14	\$4,826.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,250
CFM-CLG:	7,250
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN

BLDG: 7654

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,669.36	119.17	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,650.69	49.13	
Sub Total	7.46	14,435.40	168.30	
Economizer	0.00	3,902.39	0.00	
Ventilation/Recirculation	0.00	413.28	18.84	
DDC Control	0.00	8,914.08	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	27,665.15	206.47	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	4	1	14	\$4,826.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,625,000
BLR CAP OUTPUT (BTUH):	6,900,000

CLIMATE DATA

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN

BLDG: 7654

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7654****BUILDING NAME: ENL PERS DIN**

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	71
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN

BLDG: 7654

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,706.08	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	3,821.42	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,242.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	59.75	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	62.54	5,063.92	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7654****BUILDING NAME: ENL PERS DIN**

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	12 BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

BLDG: 7654**BUILDING NAME: ENL PERS DIN****ENERGY CALCULATION SUMMARY**

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,432.32	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,801.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,801.29	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTEN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	8.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,400
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760

CLG HRS SAVED:	740
HTG HRS SAVED:	1,184
C/H HRS SAVED:	1,929

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

BLDG: 7654

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	11,288.21	0.00	
Opt ST/SP	0.00	1,784.55	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	146.06	
Sub Total	0.00	13,072.76	146.06	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	13,072.76	147.48	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7654

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,600
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN

BLDG: 7654**BUILDING NAME: ENL PERS DIN****ENERGY CALCULATION SUMMARY**

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,889.86	0.00	
Opt ST/SP	0.00	614.95	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	73.03	
Sub Total	0.00	4,504.80	73.03	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	4,504.80	73.74	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

BUILDING 7656
GENERAL INSTRUCTION BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656

BUILDING NAME: GEN INST BLDG

Building UA:	3,640	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	15	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	15%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760
CLG HRS SAVED:	1,920	
HTG HRS SAVED:	3,072	
C/H HRS SAVED:	5,006	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7656

BUILDING NAME: GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	18,305.21	110.90	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	7,743.84	55.51	
Sub Total	7.46	27,164.39	166.41	
Economizer	0.00	2,060.35	0.00	
Ventilation/Recirculation	0.00	0.00	6.76	
DDC Control	0.00	2,415.13	58.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	31,639.88	231.23	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656

BUILDING NAME: GEN INST BLDG

Building UA: 3,640

CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	15	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	15%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760
CLG HRS SAVED:	1,920	
HTG HRS SAVED:	3,072	
C/H HRS SAVED:	5,006	

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7656

BUILDING NAME: GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	18,305.21	110.90	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	7,743.84	55.51	
Sub Total	7.46	27,164.39	166.41	
Economizer	0.00	2,060.35	0.00	
Ventilation/Recirculation	0.00	0.00	6.76	
DDC Control	0.00	2,415.13	58.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	31,639.88	231.23	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656

BUILDING NAME: GEN INST BLDG

Building UA:	3,640	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	23	0

INPUTS

Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,265,000
BLR CAP OUTPUT (BTUH):	6,900,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,600	3,360
HTG HRS ON:	2,560	5,376
H/C HRS ON:	4,171	8,760
CLG HRS SAVED:	1,760	
HTG HRS SAVED:	2,816	
C/H HRS SAVED:	4,589	

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7656**BUILDING NAME: GEN INST BLDG****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,734.05	0.00	
Opt ST/SP	0.00	512.74	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	5,246.80	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	46.86	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	5,246.80	46.86	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656

BUILDING NAME: GEN INST BLDG

Building UA: 3,640

CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	15	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760
CLG HRS SAVED:	1,920	
HTG HRS SAVED:	3,072	
C/H HRS SAVED:	5,006	

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7656

BUILDING NAME: GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,351.35	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	5,042.58	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	63.84	6,334.08	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7656

BUILDING NAME: GEN INST BLDG

Building UA:	3,640	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	23	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,600	3,360
HTG HRS ON:	2,560	5,376
H/C HRS ON:	4,171	8,760
CLG HRS SAVED:	1,760	
HTG HRS SAVED:	2,816	
C/H HRS SAVED:	4,589	

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7656

BUILDING NAME: GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,309.20	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	4,775.93	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,775.93	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

BUILDING 7658
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7658****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	163.73	
Sub Total	0.52	2,885.90	163.73	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	163.73	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7658****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	0.52	2,885.90	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	0.52	2,885.90	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

GENERAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	0.52	2,885.90	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,464.87	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	1,214.18	0.00	
Sub Total	0.52	2,885.90	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	56.17	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.52	2,942.07	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	800,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.67	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	5.67	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7658****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,613.02	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	2,981.98	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	262.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.62	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	13.55	3,244.48	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,753	CONDITIONED SQFT:	13,520
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7658

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,343.80	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,550.64	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,550.64	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

**BUILDING 7665
DENTAL CLINIC**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7665

BUILDING NAME: DENTAL CLINIC

Building UA:	4,597	CONDITIONED SQFT:	11,076
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	19,500
CFM-CLG:	19,500
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 7665

BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	78,047.51	602.30	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	17,157.24	165.49	
Sub Total	0.00	98,353.96	767.80	
Economizer	0.00	15,861.86	0.00	
Ventilation/Recirculation	0.00	719.65	29.86	
DDC Control	0.00	6,049.87	185.26	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	0.00	120,985.34	982.91	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7665

BUILDING NAME: DENTAL CLINIC

Building UA:	4,597	CONDITIONED SQFT:	11,076
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	810,000
BLR CAP OUTPUT (BTUH):	648,000

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7665**BUILDING NAME: DENTAL CLINIC****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7665

BUILDING NAME: DENTAL CLINIC

Building UA:	4,597	CONDITIONED SQFT:	11,076
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	50
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7665

BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,630.20	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	9,745.54	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	875.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	42.08	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	44.87	10,620.54	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

**BUILDING 7670
DENTAL CLINIC**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

ENERGY CALCULATION PARAMETERS

BLDG: 7670 BUILDING NAME: DENTAL CLINIC
Building UA: 6,209 CONDITIONED SQFT: 14,960

SYSTEM INFORMATION

System Type:	18
System Name:	Dual Duct air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	25,405
CFM-CLG:	25,405
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJNCWW

BLDG: 7670

BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	18
System Name:	Dual Duct air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	52,054.93	784.69	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	22,352.81	223.52	
Sub Total	0.00	76,050.56	1,008.22	
Economizer	0.00	20,665.15	0.00	
Ventilation/Recirculation	0.00	937.57	38.90	
DDC Control	0.00	7,881.90	250.22	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	0.00	105,535.18	1,297.34	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
28	Direct digital control - Dual Duct AHU	1	7	0	9	\$3,761.00
34	Outside air damper ventilation and recirculation control - Dual Duct AHU	0	1	0	0	\$272.00
37	Outside air damper economizer control - Dual Duct AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		3	8	1	13	\$5,241.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJNCWW

ENERGY CALCULATION PARAMETERS

BLDG: 7670

BUILDING NAME: DENTAL CLINIC

Building UA:	6,209	CONDITIONED SQFT:	14,960
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,308,000
BLR CAP OUTPUT (BTUH):	782,000

CLG/HTG HRS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6,153

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: AJNCWW

BLDG: 7670

BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

ENERGY CALCULATION PARAMETERS

BLDG: 7670

BUILDING NAME: DENTAL CLINIC

Building UA:	6,209	CONDITIONED SQFT:	14,960
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	83
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJNCWW

BLDG: 7670

BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,611.41	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	4,078.13	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,452.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	69.84	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	71.02	5,530.63	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJNCWW

ENERGY CALCULATION PARAMETERS

BLDG: 7670

BUILDING NAME: DENTAL CLINIC

Building UA: 6,209

CONDITIONED SQFT: 14,960

SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJNCWW

BLDG: 7670

BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,707.21	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,845.11	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,845.11	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

BUILDING 7720
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.08	
Sub Total	0.00	3,685.15	64.08	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	27.59	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,685.15	91.66	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 7720****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	9,707	CONDITIONED SQFT:	22,325
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.77	
Sub Total	0.00	1,931.91	45.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	65.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,707

CONDITIONED SQFT: 22,325

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.77	
Sub Total	0.00	1,931.91	45.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	65.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,707

CONDITIONED SQFT: 22,325

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.77	
Sub Total	0.00	1,931.91	45.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	65.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	54.92	
Sub Total	0.00	1,931.91	54.92	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.65	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	78.57	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	119.00	
Sub Total	0.00	5,169.18	119.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	51.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169.18	170.23	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	31.45	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	31.45	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTIN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,015.58	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	62.90	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,015.58	62.90	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,707

CONDITIONED SQFT: 22,325

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	- kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	219.69	
Sub Total	0.00	1,931.91	219.69	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,931.91	219.69	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7720

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,707	CONDITIONED SQFT:	22,325
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7720**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	146.46	
Sub Total	0.00	1,294.68	146.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	146.46	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 7739
MOVING TARGET SIMULATOR BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7739

BUILDING NAME: MVNG TRGT SIM BLDG

Building UA:	1,901	CONDITIONED SQFT:	4,074
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
18	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,064
CFM-CLG:	7,064
%OA:	15%
%Area:	80%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: CWW/AJN

BLDG: 7739

BUILDING NAME: MVNG TRGT SIM BLDG

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	25,458.32	104.66	
Opt ST/SP	0.00	1,272.59	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	14,407.14	136.72	
Sub Total	0.00	41,138.04	241.38	
Economizer	0.00	4,657.62	0.00	
Ventilation/Recirculation	0.00	108.78	5.68	
DDC Control	0.00	2,022.17	62.05	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	0.00	47,926.62	309.10	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7739

BUILDING NAME: MVNG TRGT SIM BLDG

Building UA: 1,901

CONDITIONED SQFT: 4,074

SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
18	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	385,000
BLR CAP OUTPUT (BTUH):	308,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWW/AJN

BLDG: 7739

BUILDING NAME: MVNG TRGT SIM BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	293.63	0.00	
Opt ST/SP	0.00	25.96	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	319.59	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.18	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	319.59	2.18	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7739

BUILDING NAME: MVNG TRGT SIM BLDG

Building UA:	1,901	CONDITIONED SQFT:	4,074
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
18	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	20
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWWW/AJN

BLDG: 7739**BUILDING NAME: MVNG TRGT SIM BLDG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	350.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	16.83	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	16.83	350.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7739

BUILDING NAME: MVNG TRGT SIM BLDG

Building UA:	1,901	CONDITIONED SQFT:	4,074
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
18	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: CWW/AJN

BLDG: 7739**BUILDING NAME: MVNG TRGT SIM BLDG****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	293.63	0.00	
Opt ST/SP	0.00	25.96	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	319.59	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	319.59	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7760
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	30%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,980.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	54.69	
Sub Total	0.00	3,243.59	54.69	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.55	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,243.59	78.24	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	39.06	
Sub Total	0.00	1,700.43	39.06	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	16.82	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,700.43	55.88	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,285

CONDITIONED SQFT: 17,163

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	39.06	
Sub Total	0.00	1,700.43	39.06	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	16.82	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,700.43	55.88	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	39.06	
Sub Total	0.00	1,700.43	39.06	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	16.82	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,700.43	55.88	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 7760****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	30%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	46.88	
Sub Total	0.00	1,700.43	46.88	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,700.43	67.06	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	30%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,180.83	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	101.57	
Sub Total	0.00	4,549.79	101.57	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	43.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,549.79	145.29	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,288.57	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	5,755.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	26.84	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,755.29	26.84	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,288.57	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	5,755.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	26.84	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,755.29	26.84	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	18,614.99	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	20,257.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	53.69	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	20,257.81	53.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,285	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760

CLG HRS SAVED:	2,160
HTG HRS SAVED:	3,456
C/H HRS SAVED:	5,631

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	187.51	
Sub Total	0.00	1,700.43	187.51	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,700.43	187.51	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,285

CONDITIONED SQFT: 17,163

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7760

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,047.14	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	125.00	
Sub Total	0.00	1,139.55	125.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,139.55	125.00	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 7780
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.26	
Sub Total	0.00	3,685.15	49.26	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.21	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,685.15	70.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	35.19	
Sub Total	0.00	1,931.91	35.19	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	15.15	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	50.34	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	35.19	
Sub Total	0.00	1,931.91	35.19	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	15.15	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	50.34	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 7,463

CONDITIONED SQFT: 17,163

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	35.19	
Sub Total	0.00	1,931.91	35.19	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	15.15	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	50.34	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 7,463

CONDITIONED SQFT: 17,163

SYSTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.23	
Sub Total	0.00	1,931.91	42.23	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	60.41	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13/METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	91.49	
Sub Total	0.00	5,169.18	91.49	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	39.39	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169.18	130.88	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	24.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	24.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	24.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	24.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	7,463	CONDITIONED SQFT:	17,163
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,015.58	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	48.36	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,015.58	48.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 7,463

CONDITIONED SQFT: 17,163

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	168.90	
Sub Total	0.00	1,931.91	168.90	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,931.91	168.90	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7780 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 7,463 CONDITIONED SQFT: 17,163

SYSTEM INFORMATION

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7780

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	112.60	
Sub Total	0.00	1,294.68	112.60	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	112.60	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 7802
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7802

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	963
BLR CAP OUTPUT (BTUH):	770

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7802**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.01	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.01	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7802

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY:

BLDG: 7802

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	252.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.12	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	12.12	252.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7802

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	6,500
CFM-CLG:	6,500
%OA:	0%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7802**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,531.24	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,421.54	160.83	
Sub Total	0.00	15,215.82	160.83	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	15,215.82	160.83	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7802

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,669

CONDITIONED SQFT: 13,280

SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7802

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,876.17	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,876.17	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7804
ENLISTED PERSONNEL DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 BUILDING NAME: ENL PERS DIN
Building UA: 2,454 CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 7804

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,579.22	115.06	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,524.80	49.13	
Sub Total	7.46	14,219.37	164.19	
Economizer	0.00	3,767.82	0.00	
Ventilation/Recirculation	0.00	399.03	18.19	
DDC Control	0.00	8,606.70	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	26,992.92	201.71	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,250
CFM-CLG:	7,250
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 7804**BUILDING NAME: ENL PERS DIN****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,669.36	119.17	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,650.69	49.13	
Sub Total	7.46	14,435.40	168.30	
Economizer	0.00	3,902.39	0.00	
Ventilation/Recirculation	0.00	413.28	18.84	
DDC Control	0.00	8,914.08	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	27,665.15	206.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION	
System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION				
Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE							
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,625,000
BLR CAP OUTPUT (BTUH):	6,900,000

RESULTS		
	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS	
HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN

BLDG: 7804

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804 BUILDING NAME: ENL PERS DIN
Building UA: 2,454 CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type: 6
System Name: Small air cooled chiller
System Number: CH-1

TYPICAL BUILDING INFORMATION

Catagory Number: 11 Construction: BRICK AND CMU Use: MESS HALL - DINING AREA Occupancy HRS: 0600-2000 Occupancy Days: M-F, SAT-SUN
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 7804

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,706.08	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	3,821.42	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	64.90	5,112.92	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,200,000
BLR CAP OUTPUT (BTUH):	2,200,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 7804

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,432.32	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,801.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	12.47	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,801.29	12.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7804

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,400
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 7804**BUILDING NAME: ENL PERS DIN****ENERGY CALCULATION SUMMARY**

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,329.73	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	486.87	
Sub Total	0.00	5,445.07	486.87	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	4.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,445.07	491.60	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7804****BUILDING NAME: ENL PERS DIN**

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,600
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 7804

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,432.32	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	243.44	
Sub Total	0.00	1,801.29	243.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	2.37	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,801.29	245.80	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

BUILDING 7806
BN HQ BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806	BUILDING NAME: BN HQ BLDG
Building UA: 3,214	CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number: 7	Construction: BRICK AND CMU	Use: BATTALION	Occupancy HRS: 0700-1800	Occupancy Days: M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	6,400
%OA:	0%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806

BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,990.08	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	29,204.34	37.64	
Sub Total	4.62	40,885.65	37.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	5,831.66	30.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	46,717.30	68.60	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806

BUILDING NAME: BN HQ BLDG

Building UA: 3,214

CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,600
CFM-CLG:	6,600
%OA:	0%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806**BUILDING NAME: BN HQ BLDG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,990.08	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	30,116.97	37.64	
Sub Total	4.62	41,798.28	37.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	6,013.90	30.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	47,812.18	68.60	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806

BUILDING NAME: BN HQ BLDG

Building UA: 3,214

CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,023,000
BLR CAP OUTPUT (BTUH):	818,400

CLG HRS ON

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760

CLG HRS SAVED:	1,860
HTG HRS SAVED:	2,976
C/H HRS SAVED:	4,849

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806**BUILDING NAME: BN HQ BLDG****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

EMCS SYSTEM NO.	EMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806

BUILDING NAME: BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806**BUILDING NAME: BN HQ BLDG****ENERGY CALCULATION SUMMARY**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,801.76	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	7,917.11	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	64.90	9,208.61	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7806

BUILDING NAME: BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	830,000
BLR CAP OUTPUT (BTUH):	830,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW/AJN

BLDG: 7806

BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.71	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	4.71	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7806****BUILDING NAME: BN HQ BLDG****Building UA: 3,214****CONDITIONED SQFT: 13,493****SYSTEM INFORMATION**

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7806

BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,018.27	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,225.11	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,225.11	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7808
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,669

CONDITIONED SQFT: 13,280

SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	528,000
BLR CAP OUTPUT (BTUH):	411,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM-AMS

BLDG: 7808

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.99	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	2.99	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808 BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 4,669 CONDITIONED SQFT: 13,280

SYSTEM INFORMATION

System Type: 6
System Name: Small air cooled chiller
System Number: CH-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM-AMS

BLDG: 7808

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	252.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.12	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	12.12	252.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM-AMS

BLDG: 7808

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,384.93	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.38	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.38	4,591.78	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.38	4,591.78	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808 BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 4,669 CONDITIONED SQFT: 13,280

SYSTEM INFORMATION

System Type: 19
System Name: Fan coil unit
System Number: FC-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	6,500
CFM-CLG:	6,500
%OA:	0%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM-AMS

BLDG: 7808

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,576.21	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,498.13	160.83	
Sub Total	0.00	15,337.39	160.83	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	15,337.39	160.83	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM-AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7808

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,669

CONDITIONED SQFT: 13,280

SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3/BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	63%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM-AMS

BLDG: 7808**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,691.03	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,897.87	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,897.87	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7810
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW/AJN

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW/AJN

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW/AJN

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	59.83	1,225.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.61	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.61	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CVWW/AJN

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/CWW/AJN

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7810

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7810**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7812
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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GENERAL INFORMATION	
System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION				
Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE							
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	290,880
BLR CAP OUTPUT (BTUH):	242,400

HOURS		
	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY:

BLDG: 7812**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,286.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.85	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	62.78	1,286.25	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.61	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.61	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7812

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7814
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/CWW

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,424,000
BLR CAP OUTPUT (BTUH):	1,939,200

OPERATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	59.83	1,225.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.61	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.61	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7814

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7816
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY:

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS**BLDG: 7816****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTIN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	290,880
BLR CAP OUTPUT (BTUH):	242,400

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY:

BLDG: 7816**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY:

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	i6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,286.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.85	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	62.78	1,286.25	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.61	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.61	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY:

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7816

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY:

BLDG: 7816**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7818
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/CWW

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type: 15
 System Name: Small Single Zone air handling unit
 System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	3.12	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	15.18	
Sub Total	1.76	0.00	15.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,704.70	25.74	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	1,704.70	40.92	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,350,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/CWW

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,400
BLR CAP OUTPUT (BTUH):	212,000

PERFORMANCE RATINGS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/CWW

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	63.03	1,291.50	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.68
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.61	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.61	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.61	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7818

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7820
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7820

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,512	CONDITIONED SQFT:	6,673
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,490
CFM-CLG:	6,490
%OA:	30%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

BLDG: 7820

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	17,744.48	202.29	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	39,168.26	91.94	
Sub Total	4.62	57,603.97	294.23	
Economizer	0.00	1,210.65	0.00	
Ventilation/Recirculation	0.00	152.62	9.62	
DDC Control	0.00	3,548.20	75.61	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	4.62	62,515.43	379.46	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7820

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,512

CONDITIONED SQFT: 6,673

SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY:

BLDG: 7820

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,876.17	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	2,876.17	2.55	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

ENERGY CALCULATION PARAMETERS

BLDG: 7820

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,512

CONDITIONED SQFT: 6,673

SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	21
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY:

BLDG: 7820

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	358.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	17.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	17.25	358.75	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

BUILDING 7824
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,917

CONDITIONED SQFT: 12,246

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,818
CFM-CLG:	4,818
%OA:	20%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,023.88	96.05	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	27,895.44	29.89	
Sub Total	7.46	53,034.66	125.94	
Economizer	0.00	998.62	0.00	
Ventilation/Recirculation	0.00	75.53	4.76	
DDC Control	0.00	2,926.76	24.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	57,035.58	155.29	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS**BLDG: 7824****BUILDING NAME: BN ADMIN & CLRM**

Building UA:	2,917	CONDITIONED SQFT:	12,246
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	7,155
CFM-CLG:	7,155
%OA:	15%
%Area:	44%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	34,838.13	106.98	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	41,426.29	46.98	
Sub Total	10.99	77,907.25	153.95	
Economizer	0.00	1,483.00	0.00	
Ventilation/Recirculation	0.00	84.13	5.30	
DDC Control	0.00	4,346.41	38.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	83,820.78	197.89	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,917

CONDITIONED SQFT: 12,246

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,818
CFM-CLG:	4,818
%OA:	20%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,023.88	96.05	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	27,895.44	29.89	
Sub Total	7.46	53,034.66	125.94	
Economizer	0.00	998.62	0.00	
Ventilation/Recirculation	0.00	75.53	4.76	
DDC Control	0.00	2,926.76	24.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	57,035.58	155.29	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,125,000
BLR CAP OUTPUT (BTUH):	900,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	3,519.57	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	6.38	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	3,519.57	6.38	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	71
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 7824

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,348.54	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	6,039.77	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,247.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	60.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	61.73	7,287.52	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

**BUILDING 7826
CLINIC W/O BEDS**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7826

BUILDING NAME: CLINIC W/O BEDS

Building UA:	1,594	CONDITIONED SQFT:	3,841
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,230
CFM-CLG:	3,230
%OA:	20%
%Area:	86%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 7826

BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,827.64	207.99	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,962.36	49.35	
Sub Total	0.00	18,256.73	257.34	
Economizer	0.00	2,364.64	0.00	
Ventilation/Recirculation	0.00	238.41	9.89	
DDC Control	0.00	901.90	55.24	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	0.00	21,761.67	322.47	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7826

BUILDING NAME: CLINIC W/O BEDS

Building UA: 1,594

CONDITIONED SQFT: 3,841

SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	344,000
BLR CAP OUTPUT (BTUH):	275,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 7826

BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,917.45	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.95	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	1,917.45	1.95	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7826

BUILDING NAME: CLINIC W/O BEDS

Building UA:	1,594	CONDITIONED SQFT:	3,841
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	10 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	10
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 7826

BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	175.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	8.42	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	8.42	175.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

**BUILDING 7832
GYMNASIUM**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7832****BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	250,000
BLR CAP OUTPUT (BTUH):	220,000

PERFORMANCE

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/CWW

BLDG: 7832**BUILDING NAME: GYMNASIUM****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	5,900,000
BLR CAP OUTPUT (BTUH):	4,720,000

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832**BUILDING NAME: GYMNASIUM****ENERGY CALCULATION SUMMARY**

System Type: 3
System Name: Small steam boiler
System Number: BLR-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	0	0	3	1	\$865.00
TOTAL:		0	0	3	1	\$865.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 BUILDING NAME: GYMNASIUM
Building UA: 2,692 CONDITIONED SQFT: 20,694

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: FC-1

TYPICAL BUILDING INFORMATION

Category Number: 16 Construction: BRICK AND CMU Use: GYMNASIUM Occupancy HRS: 0600-2200 Occupancy Days: M-F, SAT-SUN
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 7832

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.21	
Sub Total	0.00	295.53	155.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	295.53	156.80	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 7832**BUILDING NAME: GYMNASIUM****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	FC-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.21	
Sub Total	0.00	295.53	155.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	295.53	156.80	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832

BUILDING NAME: GYMNASIUM

Building UA: 2,692

CONDITIONED SQFT: 20,694

SYSTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	873.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	878.43	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7832****BUILDING NAME: GYMNASIUM**

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DCCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 7832

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	873.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	878.43	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832	BUILDING NAME: GYMNASIUM
Building UA: 2,692	CONDITIONED SQFT: 20,694

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832**BUILDING NAME: GYMNASIUM****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	873.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	878.43	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832 BUILDING NAME: GYMNASIUM
Building UA: 2,692 CONDITIONED SQFT: 20,694

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 7832

BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	873.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	878.43	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7832

BUILDING NAME: GYMNASIUM

Building UA:	2,692	CONDITIONED SQFT:	20,694
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,500
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 7832**BUILDING NAME: GYMNASIUM****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,825.93	667.16	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.94	
Sub Total	0.00	3,194.90	873.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	878.43	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

BUILDING 7834
REGIMENTAL HQ BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7834 BUILDING NAME: REGIMENTAL HQ BLDG
Building UA: 2,577 CONDITIONED SQFT: 9,904

SYSTEM INFORMATION

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
2 BRICK AND CMU ADMINISTRATION 0600-1700 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	700,000
BLR CAP OUTPUT (BTUH):	560,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AMS/AJN

BLDG: 7834

BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.97	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	3.97	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7834

BUILDING NAME: REGIMENTAL HQ BLDG

Building UA:	2,577	CONDITIONED SQFT:	9,904
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

BLDG: 7834

BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,611.41	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	4,078.13	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	26.42	4,603.13	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7834****BUILDING NAME: REGIMENTAL HQ BLDG**

Building UA:	2,577	CONDITIONED SQFT:	9,904
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

BLDG: 7834

BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,172.76	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.38	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.38	4,379.60	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.38	4,379.60	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AMS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7834

BUILDING NAME: REGIMENTAL HQ BLDG

Building UA:	2,577	CONDITIONED SQFT:	9,904
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	11,200
%OA:	20%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

BLDG: 7834**BUILDING NAME: REGIMENTAL HQ BLDG****ENERGY CALCULATION SUMMARY**

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	7,443.29	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	12,128.51	28.09	
Sub Total	0.00	19,940.77	28.09	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	19,940.77	28.09	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 7836
BN ADMINISTRATION & CLASSROOMS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,917

CONDITIONED SQFT: 12,246

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,818
CFM-CLG:	4,818
%OA:	20%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7836**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,023.88	96.05	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	27,895.44	29.89	
Sub Total	7.46	53,034.66	125.94	
Economizer	0.00	998.62	0.00	
Ventilation/Recirculation	0.00	75.53	4.76	
DDC Control	0.00	2,926.76	24.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	57,035.58	155.29	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246
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SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	7,155
CFM-CLG:	7,155
%OA:	15%
%Area:	44%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	34,838.13	106.98	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	41,426.29	46.98	
Sub Total	10.99	77,907.25	153.95	
Economizer	0.00	1,483.00	0.00	
Ventilation/Recirculation	0.00	84.13	5.30	
DDC Control	0.00	4,346.41	38.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	83,820.78	197.89	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	34,838.13	106.98	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	41,426.29	46.98	
Sub Total	10.99	77,907.25	153.95	
Economizer	0.00	1,483.00	0.00	
Ventilation/Recirculation	0.00	84.13	5.30	
DDC Control	0.00	4,346.41	38.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	83,820.78	197.89	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,917

CONDITIONED SQFT: 12,246

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,818
CFM-CLG:	4,818
%OA:	20%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-3

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,023.88	96.05	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	27,895.44	29.89	
Sub Total	7.46	53,034.66	125.94	
Economizer	0.00	998.62	0.00	
Ventilation/Recirculation	0.00	75.53	4.76	
DDC Control	0.00	2,926.76	24.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	57,035.58	155.29	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,917

CONDITIONED SQFT: 12,246

SYSTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,125,000
BLR CAP OUTPUT (BTUH):	900,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	3,519.57	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	6.38	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	3,519.57	6.38	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

Building UA:	2,917	CONDITIONED SQFT:	12,246
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	71
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7836

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,348.54	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.73	6,039.77	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,247.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	60.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	61.73	7,287.52	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

BUILDING 7842
ENLISTED BARRACKS W/AS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,000
BLR CAP OUTPUT (BTUH):	212,000

PERFORMANCE

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 7842****BUILDING NAME: ENL BARRACKS W/AS**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	73
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,268.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.01	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	62.18	1,268.75	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.75	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.75	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7842

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 7842****BUILDING NAME: ENL BARRACKS W/AS****Building UA:** 15,183**CONDITIONED SQFT:** 41,843**SYSTEM INFORMATION**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7842**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 7844
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7844****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION	
System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION				
Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE							
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	488,520
BLR CAP OUTPUT (BTUH):	407,100

CLG/HTG HRS		
	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AS/AJN

BLDG: 7844**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS POINT ID	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7844****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	63.27	1,291.50	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7844****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.75	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.75	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7844****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7844

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7844**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

**BUILDING 7846
ENLISTED BARRACKS W/AS**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 BUILDING NAME: ENL BARRACKS W/AS
Building UA: 15,183 CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,000
BLR CAP OUTPUT (BTUH):	212,000

FOUR-TEAR OPERATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM

BLDG: 7846

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS**BLDG: 7846****BUILDING NAME: ENL BARRACKS W/AS****Building UA:** 15,183**CONDITIONED SQFT:** 41,843**SYSTEM INFORMATION**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5/BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	73
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7846

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,268.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.01	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	62.18	1,268.75	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.75	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.75	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846

BUILDING NAME: ENL BARRACKS W/AS

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5/BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7846 BUILDING NAME: ENL BARRACKS W/AS
Building UA: 15,183 CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7846

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 7848
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7848****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AS/AJN

BLDG: 7848

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7848****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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GENERAL INFORMATION	
System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

DETAIL BUILDING INFORMATION				
Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:		32		
Weeks of Summer:		20		

SYSTEM OPERATING SCHEDULE							
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,400
BLR CAP OUTPUT (BTUH):	212,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AS/AJN

BLDG: 7848

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	63.27	1,291.50	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848	BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 15,183	CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.75	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.75	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848 BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 15,183 CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-2

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
5BRICK AND CMU BARRACKS 0000-2400 M-F, SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7848

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-3

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 7848****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AS/AJN

BLDG: 7848**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

**BUILDING 7850
ENLISTED BARRACKS W/AS**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,938,000
BLR CAP OUTPUT (BTUH):	2,340,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.66	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	16.66	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	254,000
BLR CAP OUTPUT (BTUH):	212,000

ENERGY CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
CGAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MMBtu/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	73
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,268.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	61.01	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	62.18	1,268.75	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5.BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.67
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7850**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.75	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.75	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.75	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS**BLDG: 7850****BUILDING NAME: ENL BARRACKS W/AS****Building UA: 15,183****CONDITIONED SQFT: 41,843****SYSTEM INFORMATION**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7850**BUILDING NAME: ENL BARRACKS W/AS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

Building UA:	15,183	CONDITIONED SQFT:	41,843
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

Building UA: 15,183

CONDITIONED SQFT: 41,843

SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7850

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 7852
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	586,000
BLR CAP OUTPUT (BTUH):	469,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.32	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	3.32	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS**BLDG: 7852****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	252.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.12	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	12.12	252.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,669

CONDITIONED SQFT: 13,280

SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 7852

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	4.21	87.50	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	7,758.69	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	8,127.66	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	8,127.66	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	6,500
CFM-CLG:	6,500
%OA:	0%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,531.24	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,421.54	160.83	
Sub Total	0.00	15,215.82	160.83	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	15,215.82	160.83	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7852

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	63%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7852**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,917.45	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,917.45	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

**BUILDING 7854
BN HQ BUILDING**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854

BUILDING NAME: BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	6,400
%OA:	0%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW/AJN

BLDG: 7854

BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,990.08	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	29,204.34	37.64	
Sub Total	4.62	40,885.65	37.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	5,831.66	30.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	46,717.30	68.60	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854

BUILDING NAME: BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,600
CFM-CLG:	6,600
%OA:	0%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW/AJN

BLDG: 7854

BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,990.08	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	30,116.97	37.64	
Sub Total	4.62	41,798.28	37.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	6,013.90	30.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	47,812.18	68.60	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854

BUILDING NAME: BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,023,000
BLR CAP OUTPUT (BTUH):	818,400

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7854

BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.80	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	5.80	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854

BUILDING NAME: BN HQ BLDG

Building UA:	3,214	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7854**BUILDING NAME: BN HQ BLDG****ENERGY CALCULATION SUMMARY**

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,801.76	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	7,917.11	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,291.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	62.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	64.90	9,208.61	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 7854 BUILDING NAME: BN HQ BLDG
 Building UA: 3,214 CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type: 25
 System Name: Hot water radiation pump
 System Number: RAD-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
 7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT

Weeks of Winter: 32
 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	
HTG HRS SAVED:	2,976	
C/H HRS SAVED:	4,849	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW/AJN

BLDG: 7854**BUILDING NAME: BN HQ BLDG****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,018.27	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,225.11	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,225.11	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 7856
ENLISTED PERSONNEL DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856

BUILDING NAME: ENL PERS DIN

Building UA: 2,454

CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/CWW

BLDG: 7856

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,579.22	115.06	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,524.80	49.13	
Sub Total	7.46	14,219.37	164.19	
Economizer	0.00	3,767.82	0.00	
Ventilation/Recirculation	0.00	399.03	18.19	
DDC Control	0.00	8,606.70	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	26,992.92	201.71	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 BUILDING NAME: ENL PERS DIN
 Building UA: 2,454 CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type: 15
 System Name: Small Single Zone air handling unit
 System Number: AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number: 11 Construction: BRICK AND CMU Use: MESS HALL - DINING AREA Occupancy HRS: 0600-2000 Occupancy Days: M-F; SAT-SUN

Weeks of Winter: 32
 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,250
CFM-CLG:	7,250
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,669.36	119.17	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,650.69	49.13	
Sub Total	7.46	14,435.40	168.30	
Economizer	0.00	3,902.39	0.00	
Ventilation/Recirculation	0.00	413.28	18.84	
DDC Control	0.00	8,914.08	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	27,665.15	206.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,625,000
BLR CAP OUTPUT (BTUH):	6,900,000

ENERGY CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAGC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 09-Dec-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856**BUILDING NAME: ENL PERS DIN****ENERGY CALCULATION SUMMARY**

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTION NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
TOTAL:		1	0	3	1	\$1,015.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856 BUILDING NAME: ENL PERS DIN
Building UA: 2,454 CONDITIONED SQFT: 13,493

SYSTEM INFORMATION

System Type: 6
System Name: Small air cooled chiller
System Number: CH-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
11 BRICK AND CMU MESS HALL - DINING AREA 0600-2000 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	71
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,706.08	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	3,821.42	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,242.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	59.75	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	62.54	5,063.92	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 7856****BUILDING NAME: ENL PERS DIN**

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,200,000
BLR CAP OUTPUT (BTUH):	2,200,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,432.32	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,801.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	12.47	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,801.29	12.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	12 BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,400
CFM-CLG:	0
%QA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	7,055.13	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	486.87	
Sub Total	0.00	8,170.48	486.87	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	4.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	8,170.48	491.60	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 7856

BUILDING NAME: ENL PERS DIN

Building UA:	2,454	CONDITIONED SQFT:	13,493
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,600
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/CWW

BLDG: 7856**BUILDING NAME: ENL PERS DIN****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,333.91	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	243.44	
Sub Total	0.00	2,702.88	243.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	2.37	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,702.88	245.80	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

BUILDING 7858
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7858

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,669

CONDITIONED SQFT: 13,280

SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 7858

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	252.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.12	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	12.12	252.00	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7858

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	6,500
CFM-CLG:	6,500
%OA:	0%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7858

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,531.24	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,421.54	160.83	
Sub Total	0.00	15,215.82	160.83	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	15,215.82	160.83	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7858

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	4,669	CONDITIONED SQFT:	13,280
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SYSTEM INFORMATION

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	63%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7858**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	25
System Name:	Hot water radiation pump
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,876.17	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,876.17	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

**BUILDING 7865
UNIT CHAPEL**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865

BUILDING NAME: UNIT CHAPEL

Building UA:	2,526	CONDITIONED SQFT:	8,718
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8.BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,000
CFM-CLG:	10,000
%OA:	22%
%Area:	55%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7865

BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	25,340.75	211.99	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	11,586.14	141.71	
Sub Total	7.46	38,042.23	353.70	
Economizer	0.00	3,659.39	0.00	
Ventilation/Recirculation	0.00	232.17	11.27	
DDC Control	0.00	17,722.31	77.38	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	59,656.10	442.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865 BUILDING NAME: UNIT CHAPEL
Building UA: 2,526 CONDITIONED SQFT: 8,718

SYSTEM INFORMATION

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,125,000
BLR CAP OUTPUT (BTUH):	900,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865

BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,591.47	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,729.36	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	6.38	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	1,729.36	6.38	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865

BUILDING NAME: UNIT CHAPEL

Building UA: 2,526

CONDITIONED SQFT: 8,718

SYSTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8 BRICK AND CMU	CHURCH	0700-1800	SAT-SUN

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	12
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865**BUILDING NAME: UNIT CHAPEL****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	210.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	10.10	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	10.10	210.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865

BUILDING NAME: UNIT CHAPEL

Building UA:	2,526	CONDITIONED SQFT:	8,718
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8/BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865**BUILDING NAME: UNIT CHAPEL****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	25.25	525.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865

BUILDING NAME: UNIT CHAPEL

Building UA:	2,526	CONDITIONED SQFT:	8,718
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
8	BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

CONSTANTS

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865**BUILDING NAME: UNIT CHAPEL****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,777.11	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	9,243.84	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	9,243.84	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7865

BUILDING NAME: UNIT CHAPEL

Building UA:	2,526	CONDITIONED SQFT:	8,718
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2BRICK AND CMU	ADMINISTRATION	0600-1700	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	4,390
CFM-CLG:	4,390
%OA:	15%
%Area:	45%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7865**BUILDING NAME: UNIT CHAPEL****ENERGY CALCULATION SUMMARY**

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,889.86	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	4,431.64	12.39	
Sub Total	0.00	8,528.34	12.39	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	8,528.34	12.39	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

**BUILDING 7866
THEATER W/DRESSING ROOM**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

Building UA: 3,187

CONDITIONED SQFT: 11,098

SYSTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	20 BRICK AND CMU	THEATER	1700-2400	TH-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760
CLG HRS SAVED:	2,880	
HTG HRS SAVED:	4,608	
C/H HRS SAVED:	7,509	

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.21	87.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

Building UA:	3,187	CONDITIONED SQFT:	11,098
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	20/BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	14,500
CFM-CLG:	14,500
%OA:	20%
%Area:	90%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760
CLG HRS SAVED:	2,880	
HTG HRS SAVED:	4,608	
C/H HRS SAVED:	7,509	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	65,052.84	579.21	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	51,824.16	579.40	
Sub Total	14.19	118,998.50	1,158.61	
Economizer	0.00	3,411.39	0.00	
Ventilation/Recirculation	0.00	520.97	23.53	
DDC Control	0.00	12,683.85	332.72	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	14.19	135,614.71	1,514.86	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

Building UA: 3,187

CONDITIONED SQFT: 11,098

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	20 BRICK AND CMU	THEATER	1700-2400	TH-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	15%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760
CLG HRS SAVED:	2,880	
HTG HRS SAVED:	4,608	
C/H HRS SAVED:	7,509	

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,277.43	53.93	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	6,433.34	64.38	
Sub Total	2.47	17,079.74	118.30	
Economizer	0.00	423.48	0.00	
Ventilation/Recirculation	0.00	48.50	2.19	
DDC Control	0.00	1,574.55	36.97	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	19,126.28	157.46	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 BUILDING NAME: THEATER W/DRESS RM
Building UA: 3,187 CONDITIONED SQFT: 11,098

SYSTEM INFORMATION

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
3BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	0.50
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	982,500
BLR CAP OUTPUT (BTUH):	786,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760
CLG HRS SAVED:	2,880	
HTG HRS SAVED:	4,608	
C/H HRS SAVED:	7,509	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866**BUILDING NAME: THEATER W/DRESS RM****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,131.83	0.00	
Opt ST/SP	0.00	141.10	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,272.93	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.57	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	2,272.93	5.57	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866 BUILDING NAME: THEATER W/DRESS RM
Building UA: 3,187 CONDITIONED SQFT: 11,098

SYSTEM INFORMATION

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
20	BRICK AND CMU	THEATER	1700-2400	TH-F,SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760
CLG HRS SAVED:	2,880	
HTG HRS SAVED:	4,608	
C/H HRS SAVED:	7,509	

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	25.25	525.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

Building UA: 3,187

CONDITIONED SQFT: 11,098

SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	20BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760
CLG HRS SAVED:	2,880	
HTG HRS SAVED:	4,608	
C/H HRS SAVED:	7,509	

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,974.07	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	4,237.11	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,237.11	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 7866

BUILDING NAME: THEATER W/DRESS RM

Building UA: 3,187

CONDITIONED SQFT: 11,098

SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
20	BRICK AND CMU	THEATER	1700-2400	TH-F,SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	18	0	0	0	18	18	18
REQ STOP:	24	0	0	0	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	480	3,360
HTG HRS ON:	768	5,376
H/C HRS ON:	1,251	8,760
CLG HRS SAVED:	2,880	
HTG HRS SAVED:	4,608	
C/H HRS SAVED:	7,509	

CONSTANTS

HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 7866**BUILDING NAME: THEATER W/DRESS RM****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	HWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,974.07	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	4,237.11	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,237.11	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

BUILDING 7900
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/AMS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	60.11	
Sub Total	0.00	3,685.15	60.11	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	25.88	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,685.15	85.99	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/AMS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.93	
Sub Total	0.00	1,931.91	42.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	61.42	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.93	
Sub Total	0.00	1,931.91	42.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	61.42	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 9,106 CONDITIONED SQFT: 20,943

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-4

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.93	
Sub Total	0.00	1,931.91	42.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	61.42	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 9,106 CONDITIONED SQFT: 20,943

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-5

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	51.52	
Sub Total	0.00	1,931.91	51.52	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	22.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	73.70	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,106	CONDITIONED SQFT:	20,943
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/AMS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	111.63	
Sub Total	0.00	5,169.18	111.63	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	48.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169.18	159.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 9,106 CONDITIONED SQFT: 20,943

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-1

TYPICAL BUILDING INFORMATION

Category Number: 14 METAL PANEL AND CMU Construction: VEH MAINT SHOP Use: 0700-1800 Occupancy HRS: M-F Occupancy Days:

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/AMS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	29.50	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	29.50	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,106

CONDITIONED SQFT: 20,943

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	29.50	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	29.50	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,106

CONDITIONED SQFT: 20,943

SYSTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,015.58	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	59.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,015.58	59.01	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,106

CONDITIONED SQFT: 20,943

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	206.09	
Sub Total	0.00	1,931.91	206.09	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,931.91	206.09	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7900 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 9,106 CONDITIONED SQFT: 20,943

SYSTEM INFORMATION

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7900**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	137.39	
Sub Total	0.00	1,294.68	137.39	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	137.39	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 7920
VEHICLE MAINTENANCE SHOP DS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type: 8
System Name: Air cooled DX compressor
System Number: ACCU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA: 43,349

CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.52	52.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920	BUILDING NAME: VEH MNT SHOP DS
Building UA: 43,349	CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 8
System Name: Air cooled DX compressor
System Number: ACCU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-7

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	8
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	140.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	6.73	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	6.73	140.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUHC:	0.000941
NSUC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	3.12	18,141.98	52.44	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	18,972.63	85.65	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS
Building UA: 43,349 CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,575
CFM-CLG:	1,575
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,319.72	16.76	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	9,737.23	39.66	
Sub Total	3.12	20,523.68	56.43	
Economizer	0.00	274.22	0.00	
Ventilation/Recirculation	0.00	12.35	0.78	
DDC Control	0.00	803.68	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	21,613.92	89.83	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 7920****BUILDING NAME: VEH MNT SHOP DS**

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	3.12	18,141.98	52.44	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	18,972.63	85.65	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA: 43,349

CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	3.12	18,141.98	52.44	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	18,972.63	85.65	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	3.12	18,141.98	52.44	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	18,972.63	85.65	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS
Building UA: 43,349 CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-6

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
7 BRICK AND CMU BATTALION 0700-1800 M-F, SAT

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,256.40	12.77	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	7,418.84	39.66	
Sub Total	3.12	18,141.98	52.44	
Economizer	0.00	208.93	0.00	
Ventilation/Recirculation	0.00	9.41	0.59	
DDC Control	0.00	612.32	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	18,972.63	85.65	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,700
CFM-CLG:	3,700
%OA:	10%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,678.53	39.38	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	22,874.77	39.66	
Sub Total	3.12	34,020.02	79.04	
Economizer	0.00	644.19	0.00	
Ventilation/Recirculation	0.00	29.00	1.83	
DDC Control	0.00	1,888.00	32.62	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	36,581.21	113.49	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	0.00	9,829.07	102.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,829.07	146.19	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	0.00	9,829.07	102.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,829.07	146.19	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920	BUILDING NAME: VEH MNT SHOP DS
Building UA: 43,349	CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	0.00	9,829.07	102.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,829.07	146.19	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0.000105
NSUC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	0.00	6,636.72	102.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,636.72	146.19	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	102.20	
Sub Total	0.00	6,636.72	102.20	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,636.72	146.19	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	20,250
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	70.23	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	19,625
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	28,045.43	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	30,166.92	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	30,166.92	70.23	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA: 43,349

CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	20,900
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	70.23	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	20,900
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,859.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,859.81	70.23	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920	BUILDING NAME: VEH MNT SHOP DS
Building UA: 43,349	CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14,METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F	
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	20,900
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	70.23	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS
Building UA: 43,349 CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-6

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
14 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	14,500
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,859.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	70.23	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,859.81	70.23	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA: 43,349

CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	0.00	0.00	310.67	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	0.00	310.67	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920 BUILDING NAME: VEH MNT SHOP DS
Building UA: 43,349 CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	0.00	0.00	310.67	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	0.00	310.67	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	0.00	0.00	310.67	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	0.00	310.67	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920	BUILDING NAME: VEH MNT SHOP DS
Building UA: 43,349	CONDITIONED SQFT: 124,553

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920**BUILDING NAME: VEH MNT SHOP DS****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	0.00	0.00	310.67	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	0.00	310.67	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	310.67	
Sub Total	0.00	0.00	310.67	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	0.00	310.67	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

Building UA:	43,349	CONDITIONED SQFT:	124,553
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	20,240
CFM-CLG:	0
%OA:	0%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DCCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7920

BUILDING NAME: VEH MNT SHOP DS

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	735.81	
Sub Total	0.00	15,859.81	735.81	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	15,859.81	735.81	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 7940
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	30%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	63.43	
Sub Total	0.00	3,685.15	63.43	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	27.31	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,685.15	90.74	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 7940****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	9,609	CONDITIONED SQFT:	22,405
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.31	
Sub Total	0.00	1,931.91	45.31	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.51	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	64.81	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.31	
Sub Total	0.00	1,931.91	45.31	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.51	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	64.81	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.31	
Sub Total	0.00	1,931.91	45.31	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.51	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	64.81	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	30%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	54.37	
Sub Total	0.00	1,931.91	54.37	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.41	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	77.78	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 9,609 CONDITIONED SQFT: 22,405

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-6

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	30%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	117.80	
Sub Total	0.00	5,169.18	117.80	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	50.72	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169.18	168.51	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	31.13	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 9,609 CONDITIONED SQFT: 22,405

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	31.13	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 9,609 CONDITIONED SQFT: 22,405

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-3

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
14 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,510.43	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,625.77	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	62.27	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,625.77	62.27	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	9,609	CONDITIONED SQFT:	22,405
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	217.47	
Sub Total	0.00	1,931.91	217.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,931.91	217.47	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7940

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,609

CONDITIONED SQFT: 22,405

SYSTEM INFORMATION

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7940**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	144.98	
Sub Total	0.00	1,294.68	144.98	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	144.98	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 7960
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAHC:	0
HOAOH:	0
COAHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.32	
Sub Total	0.00	3,685.15	57.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	24.68	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,685.15	81.99	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 8,683 CONDITIONED SQFT: 20,245

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-2

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	40.94	
Sub Total	0.00	1,931.91	40.94	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	58.57	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 8,683 CONDITIONED SQFT: 20,245

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	40.94	
Sub Total	0.00	1,931.91	40.94	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	58.57	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,683

CONDITIONED SQFT: 20,245

SYSTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15
 System Name: Small Single Zone air handling unit
 System Number: AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	40.94	
Sub Total	0.00	1,931.91	40.94	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.63	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	58.57	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,683

CONDITIONED SQFT: 20,245

SYSTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.13	
Sub Total	0.00	1,931.91	49.13	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.15	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	70.28	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 8,683 CONDITIONED SQFT: 20,245

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	106.44	
Sub Total	0.00	5,169.18	106.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	45.83	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169.18	152.27	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 8,683 CONDITIONED SQFT: 20,245

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	28.13	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,683

CONDITIONED SQFT: 20,245

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	28.13	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,683	CONDITIONED SQFT:	20,245
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,015.58	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	56.27	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,015.58	56.27	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,683

CONDITIONED SQFT: 20,245

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	196.51	
Sub Total	0.00	1,931.91	196.51	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,931.91	196.51	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 7960****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	8,683	CONDITIONED SQFT:	20,245
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7960

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	131.01	
Sub Total	0.00	1,294.68	131.01	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	131.01	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8002
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8002

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8002

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8002	BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 5,777	CONDITIONED SQFT: 22,700

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5.BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8002

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8006
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8006

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8006

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8006

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5.BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8006**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8008
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8008

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8008

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	1.84	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8008 BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 2,899 CONDITIONED SQFT: 11,549

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
5 BRICK AND CMU BARRACKS 0000-2400 M-F, SAT-SUN
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8008

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

**BUILDING 8010
DET DAY ROOM**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8010	BUILDING NAME: DET DAY ROOM
Building UA: 665	CONDITIONED SQFT: 2,100

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number: 7	Construction: BRICK AND CMU	Use: BATTALION	Occupancy HRS: 0700-1800	Occupancy Days: M-F, SAT
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Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	8
REQ STOP:	0	21	21	21	21	21	11

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,770
CFM-CLG:	2,770
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,560	3,360
HTG HRS ON:	2,496	5,376
H/C HRS ON:	4,067	8,760
CLG HRS SAVED:	1,800	
HTG HRS SAVED:	2,880	
C/H HRS SAVED:	4,693	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 8010

BUILDING NAME: DET DAY ROOM

ENERGY CALCULATION SUMMARY

System Type: 15
 System Name: Small Single Zone air handling unit
 System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,011.17	21.06	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,232.26	24.34	
Sub Total	2.47	18,612.40	45.40	
Economizer	0.00	895.65	0.00	
Ventilation/Recirculation	0.00	21.71	1.37	
DDC Control	0.00	2,624.97	20.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	22,154.73	66.78	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

BUILDING 8012
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8012 BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 5,777 CONDITIONED SQFT: 22,700

SYSTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
5 BRICK AND CMU BARRACKS 0000-2400 M-F, SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8012

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8012

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	5,777	CONDITIONED SQFT:	22,700
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8012

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8014
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8014	BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 2,899	CONDITIONED SQFT: 11,549

SYSTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8014

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	1.84	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8014

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 2,899

CONDITIONED SQFT: 11,549

SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8014**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8020
DET DAY ROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8020 BUILDING NAME: DET DAY ROOM
Building UA: 665 CONDITIONED SQFT: 2,100

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
7 BRICK AND CMU BATTALION 0700-1800 M-F, SAT

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	8
REQ STOP:	0	21	21	21	21	21	11

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,770
CFM-CLG:	2,770
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,560	3,360
HTG HRS ON:	2,496	5,376
H/C HRS ON:	4,067	8,760
CLG HRS SAVED:	1,800	
HTG HRS SAVED:	2,880	
C/H HRS SAVED:	4,693	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 8020

BUILDING NAME: DET DAY ROOM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,011.17	21.06	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,232.26	24.34	
Sub Total	2.47	18,612.40	45.40	
Economizer	0.00	895.65	0.00	
Ventilation/Recirculation	0.00	21.71	1.37	
DDC Control	0.00	2,624.97	20.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	22,154.73	66.78	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

BUILDING 8021
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	450,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	2.55	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 5,496 CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,213.37	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	10,680.10	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	10,680.10	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	18,000
CFM-CLG:	18,000
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 19
System Name: Fan coil unit
System Number: FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,756.09	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	27,150.99	189.32	
Sub Total	0.00	33,170.12	189.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	33,170.12	189.32	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,989.79	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,989.79	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,989.79	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,989.79	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021 BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 5,496 CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-3

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DCCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,989.79	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,989.79	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 5,496

CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3'BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,989.79	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,989.79	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8021	BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 5,496	CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-5

TYPICAL BUILDING INFORMATION

Category Number: 3BRICK AND CMU	Construction: ADMIN & SUPPLY	Use: 0700-1600	Occupancy HRS: M-F	Occupancy Days:
Weeks of Winter: 32				
Weeks of Summer: 20				

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8021**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,851.89	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,989.79	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,989.79	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

BUILDING 8023
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	586,000
BLR CAP OUTPUT (BTUH):	586,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAHC:	0
HOAOH:	0
COAHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.32	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.32	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	5,344.59	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	5,344.59	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	18,000
CFM-CLG:	18,000
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DCCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type: 19
System Name: Fan coil unit
System Number: FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	23,969.24	189.32	
Sub Total	0.00	29,313.83	189.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	29,313.83	189.32	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023 BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 5,496 CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP: 0.50
HP Effic: 0.66
Load Factor: 0.80
CFM-HTG: 2,400
CFM-CLG: 0
%OA: 100%
%Area: 13%
CHILLER CAP (TONS): 0
KW-TON: 0.00
BLR CAP INPUT (BTUH): 0
BLR CAP OUTPUT (BTUH): 0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 5,496

CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/JM

BLDG: 8023

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023	BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 5,496	CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-3

TYPICAL BUILDING INFORMATION

Category Number: 3	Construction: BRICK AND CMU	Use: ADMIN & SUPPLY	Occupancy HRS: 0700-1600	Occupancy Days: M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type: '16
System Name: Heating and Ventilating Unit
System Number: HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023	BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 5,496	CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/JM

BLDG: 8023

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8023

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUH:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8023**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

BUILDING 8025
BN ADMINISTRATION & CLASSROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858 CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	2,610
%OA:	30%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760
CLG HRS SAVED:	2,380	
HTG HRS SAVED:	3,808	
C/H HRS SAVED:	6,205	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,909.22	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	15,467.38	0.00	
Sub Total	1.17	20,843.33	0.00	
Economizer	0.00	537.14	0.00	
Ventilation/Recirculation	0.00	162.39	0.00	
DDC Control	0.00	1,575.60	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	1.17	23,118.46	0.00	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025

BUILDING NAME: BN ADMIN & CLRM

Building UA: 2,858

CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	4,850
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760
CLG HRS SAVED:	2,380	
HTG HRS SAVED:	3,808	
C/H HRS SAVED:	6,205	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 8025

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 10
 System Name: Multizone air handling unit
 System Number: AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,963.71	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	28,742.07	0.00	
Sub Total	1.73	36,397.01	0.00	
Economizer	0.00	998.13	0.00	
Ventilation/Recirculation	0.00	201.18	0.00	
DDC Control	0.00	2,927.85	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	1.73	40,524.17	0.00	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858 CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	2,610
%OA:	30%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760
CLG HRS SAVED:	2,380	
HTG HRS SAVED:	3,808	
C/H HRS SAVED:	6,205	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,909.22	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	15,467.38	0.00	
Sub Total	1.17	20,843.33	0.00	
Economizer	0.00	537.14	0.00	
Ventilation/Recirculation	0.00	162.39	0.00	
DDC Control	0.00	1,575.60	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	1.17	23,118.46	0.00	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025	BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858	CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number: 7 BRICK AND CMU	Construction: BATTALION	Use: 0700-1800	Occupancy HRS: M-F; SAT
Weeks of Winter: 32			
Weeks of Summer: 20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	780,000
BLR CAP OUTPUT (BTUH):	780,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760
CLG HRS SAVED:	2,380	
HTG HRS SAVED:	3,808	
C/H HRS SAVED:	6,205	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.42	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	4.42	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025	BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858	CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760
CLG HRS SAVED:	2,380	
HTG HRS SAVED:	3,808	
C/H HRS SAVED:	6,205	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 26
System Name: Pump
System Number: CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,052.58	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.66	2,315.62	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.66	2,315.62	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8025 BUILDING NAME: BN ADMIN & CLRM
 Building UA: 2,858 CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 25
 System Name: Hot water radiation pump
 System Number: RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	980	3,360
HTG HRS ON:	1,568	5,376
H/C HRS ON:	2,555	8,760
CLG HRS SAVED:	2,380	
HTG HRS SAVED:	3,808	
C/H HRS SAVED:	6,205	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8025**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,606.65	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	4,975.62	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,975.62	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
TOTAL:		1	0	1	1	\$570.00

BUILDING 8037
BN ADMINISTRATION & CLASSROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858 CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
7/BRICK AND CMU BATTALION 0700-1800 M-F, SAT
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP: 2.00
HP Effic: 0.78
Load Factor: 0.80
CFM-HTG: 0
CFM-CLG: 2,610
%OA: 30%
%Area: 0%
CHILLER CAP (TONS): 0
KW-TON: 0.00
BLR CAP INPUT (BTUH): 0
BLR CAP OUTPUT (BTUH): 0

CONSTANTS

HOAUHC: 16.2
HOAUH: 26.1
COAUHC: 0.000257
COAUC: 0.00068
HOAOHC: 33.3
HOAOH: 53.5
COAOHC: 0.00115
COAOC: 0.00305
DC DUTY: 0.17
DC DEMAND: 0.17
ECC: 0.00021
ECHC: 0.0000795
NSUCHC: 0.000941
NSUCC: 0.00249
DDCCHC: 0.000233
DDCCC: 0.000616
NSC: 36600
DDCH: 30100
OPT: 305
CHWR: 17.5
CNWR: 0
OAR: 5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,661.69	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	14,687.51	0.00	
Sub Total	1.17	19,815.94	0.00	
Economizer	0.00	602.91	0.00	
Ventilation/Recirculation	0.00	162.39	0.00	
DDC Control	0.00	1,768.54	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	1.17	22,349.78	0.00	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858 CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-2

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
7 BRICK AND CMU BATTALION 0700-1800 M-F, SAT
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	4,850
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JMAJN/AMS

BLDG: 8037

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,612.60	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.73	0.00	0.00	
Night Setback	0.00	27,292.89	0.00	
Sub Total	1.73	34,596.72	0.00	
Economizer	0.00	1,120.35	0.00	
Ventilation/Recirculation	0.00	201.18	0.00	
DDC Control	0.00	3,286.36	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	1.73	39,204.61	0.00	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037	BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858	CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-3

TYPICAL BUILDING INFORMATION

Category Number: 7	Construction: BRICK AND CMU	Use: BATTALION	Occupancy HRS: 0700-1800	Occupancy Days: M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	2,610
%OA:	30%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JMAJN/AMS

BLDG: 8037

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 10
 System Name: Multizone air handling unit
 System Number: AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,661.69	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	14,687.51	0.00	
Sub Total	1.17	19,815.94	0.00	
Economizer	0.00	602.91	0.00	
Ventilation/Recirculation	0.00	162.39	0.00	
DDC Control	0.00	1,768.54	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	1.17	22,349.78	0.00	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM
 Building UA: 2,858 CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
 7 BRICK AND CMU BATTALION 0700-1800 M-F, SAT

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	780,000
BLR CAP OUTPUT (BTUH):	780,000

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,374.38	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	4,743.35	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.42	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,743.35	4.42	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037	BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858	CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 26
System Name: Pump
System Number: CWP-1

TYPICAL BUILDING INFORMATION

Category Number: 7 BRICK AND CMU	Construction: BATTALION	Occupancy HRS: 0700-1800	Occupancy Days: M-F, SAT
Weeks of Winter: 32			
Weeks of Summer: 20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.000068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037**BUILDING NAME: BN ADMIN & CLRM****ENERGY CALCULATION SUMMARY**

System Type: 26
System Name: Pump
System Number: CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,949.09	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.66	2,212.13	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.66	2,212.13	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8037 BUILDING NAME: BN ADMIN & CLRM
Building UA: 2,858 CONDITIONED SQFT: 12,000

SYSTEM INFORMATION

System Type: 26
System Name: Pump
System Number: HWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8037

BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 26

System Name: Pump

System Number: HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,452.31	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,659.15	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	2,659.15	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

BUILDING 8038
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8038	BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 5,777	CONDITIONED SQFT: 22,700

SYSTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8038

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8038 BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 5,777 CONDITIONED SQFT: 22,700

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8038

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8040
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8040

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 2,899

CONDITIONED SQFT: 11,549

SYSTEM INFORMATION

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8040

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	1.84	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8040 BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 2,899 CONDITIONED SQFT: 11,549

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
5 BRICK AND CMU BARRACKS 0000-2400 M-F, SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP: 1.50
HP Effic: 0.74
Load Factor: 0.80
CFM-HTG: 0
CFM-CLG: 0
%OA: 0%
%Area: 0%
CHILLER CAP (TONS): 0
KW-TON: 0.00
BLR CAP INPUT (BTUH): 0
BLR CAP OUTPUT (BTUH): 0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC: 0
HOAUH: 0
COAUHC: 0
COAUC: 0
HOAOHC: 0
HOAOH: 0
COAOHC: 0
COAOC: 0
DC DUTY: 0.17
DC DEMAND: 0.17
ECC: 0
ECHC: 0
NSUCHC: 0
NSUCC: 0
DDCCHC: 0.0000556
DDCCC: 0.000147
NSC: 20000
DDCH: 33900
OPT: 0
CHWR: 17.5
CNWR: 0
OAR: 5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8040**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8042
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8042 BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 5,777 CONDITIONED SQFT: 22,700

SYSTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8042**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

ENERGY CALCULATION PARAMETERS

BLDG: 8042

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 5,777

CONDITIONED SQFT: 22,700

SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM

BLDG: 8042**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8044
APP INSTR BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8044 BUILDING NAME: APP INSTR BLDG
Building UA: 839 CONDITIONED SQFT: 2,470

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
21 BRICK AND CMU TRAINING 0700-2100 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1.500
CFM-CLG:	1.500
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	
HTG HRS SAVED:	1,792	
C/H HRS SAVED:	2,920	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8044

BUILDING NAME: APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type: 15
 System Name: Small Single Zone air handling unit
 System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,320.19	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	967.98	25.59	
Sub Total	0.92	2,426.07	25.59	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	805.04	26.76	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.92	3,231.11	52.35	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8044 BUILDING NAME: APP INSTR BLDG
Building UA: 839 CONDITIONED SQFT: 2,470

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-2

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
21 BRICK AND CMU TRAINING 0700-2100 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,500
CFM-CLG:	1,500
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	
HTG HRS SAVED:	1,792	
C/H HRS SAVED:	2,920	

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8044**BUILDING NAME: APP INSTR BLDG****ENERGY CALCULATION SUMMARY**

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,320.19	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	967.98	25.59	
Sub Total	0.92	2,426.07	25.59	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	805.04	26.76	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.92	3,231.11	52.35	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8044 BUILDING NAME: APP INSTR BLDG
Building UA: 839 CONDITIONED SQFT: 2,470

SYSTEM INFORMATION

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
21 BRICK AND CMU TRAINING 0700-2100 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	9
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	
HTG HRS SAVED:	1,792	
C/H HRS SAVED:	2,920	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8044**BUILDING NAME: APP INSTR BLDG****ENERGY CALCULATION SUMMARY**

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	148.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	7.15	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.15	148.75	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

**BUILDING 8046
DET DAY ROOM**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8046 BUILDING NAME: DET DAY ROOM
Building UA: 665 CONDITIONED SQFT: 2,100

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	8
REQ STOP:	0	21	21	21	21	21	11

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,770
CFM-CLG:	2,770
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,560	3,360
HTG HRS ON:	2,496	5,376
H/C HRS ON:	4,067	8,760
CLG HRS SAVED:	1,800	
HTG HRS SAVED:	2,880	
C/H HRS SAVED:	4,693	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8046**BUILDING NAME: DET DAY ROOM****ENERGY CALCULATION SUMMARY**

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,011.17	21.06	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,232.26	24.34	
Sub Total	2.47	18,612.40	45.40	
Economizer	0.00	895.65	0.00	
Ventilation/Recirculation	0.00	21.71	1.37	
DDC Control	0.00	2,624.97	20.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	22,154.73	66.78	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

BUILDING 8048
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8048

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:

2,899

CONDITIONED SQFT:

11,549

SYSTEM INFORMATION

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8048

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	1.84	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8048 BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 2,899 CONDITIONED SQFT: 11,549

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8048**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8050
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8050 BUILDING NAME: ENL BARRACKS W/O DIN
Building UA: 2,899 CONDITIONED SQFT: 11,549

SYSTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8050

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	1.84	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8050

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA:	2,899	CONDITIONED SQFT:	11,549
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5/BRICK AND CMU	BARRACKS	0000-2400	M-F, SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8050

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8052
SENIOR ENLISTED QUARTERS

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8052 BUILDING NAME: SR ENL QTRS
Building UA: 5,777 CONDITIONED SQFT: 22,700

SYSTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	650,000

HOURS CALCULATIONS

	REQUIRED HRYR	PRESENT HRYR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8052

BUILDING NAME: SR ENL QTRS

ENERGY CALCULATION SUMMARY

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.69	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.69	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8052 BUILDING NAME: SR ENL QTRS
Building UA: 5,777 CONDITIONED SQFT: 22,700

SYSTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8052**BUILDING NAME: SR ENL QTRS****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.46	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8054
ENLISTED BARRACKS W/O DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8054

BUILDING NAME: ENL BARRACKS W/O DIN

Building UA: 2,899

CONDITIONED SQFT: 11,549

SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
5	BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	325,000
BLR CAP OUTPUT (BTUH):	325,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8054

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	1.84	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8054****BUILDING NAME: ENL BARRACKS W/O DIN**

Building UA:	2,899	CONDITIONED SQFT:	11,549
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8054**BUILDING NAME: ENL BARRACKS W/O DIN****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

BUILDING 8056
DET DAY ROOM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8056

BUILDING NAME: DET DAY ROOM

Building UA:	665	CONDITIONED SQFT:	2,100
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	8
REQ STOP:	0	21	21	21	21	21	11

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,770
CFM-CLG:	2,770
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,560	3,360
HTG HRS ON:	2,496	5,376
H/C HRS ON:	4,067	8,760
CLG HRS SAVED:	1,800	
HTG HRS SAVED:	2,880	
C/H HRS SAVED:	4,693	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 8056**BUILDING NAME: DET DAY ROOM****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,011.17	21.06	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,232.26	24.34	
Sub Total	2.47	18,612.40	45.40	
Economizer	0.00	895.65	0.00	
Ventilation/Recirculation	0.00	21.71	1.37	
DDC Control	0.00	2,624.97	20.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	22,154.73	66.78	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

BUILDING 8057
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057 BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 5,496 CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	450,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	2.55	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	5,344.59	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	5,344.59	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	18,000
CFM-CLG:	18,000
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	23,969.24	189.32	
Sub Total	0.00	29,313.83	189.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	29,313.83	189.32	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8057****BUILDING NAME: ADMIN & SUPPORT BLDG****Building UA: 5,496****CONDITIONED SQFT: 23,676****SYSTEM INFORMATION**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8057****BUILDING NAME: ADMIN & SUPPORT BLDG****Building UA:** 5,496**CONDITIONED SQFT:** 23,676**SYSTEM INFORMATION**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN

BLDG: 8057

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

BUILDING 8059
ADMINISTRATION & SUPPLY BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8059****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	586,000
BLR CAP OUTPUT (BTUH):	586,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.32	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	3.32	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8059****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	24
System Name:	Dual temperature water pump
System Number:	DTWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.76	5,344.59	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	5,344.59	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
TOTAL:		1	0	1	4	\$1,418.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8059****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	18,000
CFM-CLG:	18,000
%OA:	20%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

BLDG: 8059**BUILDING NAME: ADMIN & SUPPORT BLDG****ENERGY CALCULATION SUMMARY**

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,081.55	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	23,969.24	189.32	
Sub Total	0.00	29,313.83	189.32	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	29,313.83	189.32	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059

BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN

BLDG: 8059

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS

BLDG: 8059 BUILDING NAME: ADMIN & SUPPORT BLDG
Building UA: 5,496 CONDITIONED SQFT: 23,676

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-2

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN

BLDG: 8059

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8059****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 8059

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8059****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN

BLDG: 8059

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN

ENERGY CALCULATION PARAMETERS**BLDG: 8059****BUILDING NAME: ADMIN & SUPPORT BLDG**

Building UA:	5,496	CONDITIONED SQFT:	23,676
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN

BLDG: 8059

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.47	
Sub Total	0.00	1,772.77	64.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,772.77	85.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

BUILDING 8063
ENLISTED PERSONNEL DINING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8063

BUILDING NAME: ENL PERS DIN

Building UA: 3,330

CONDITIONED SQFT: 18,313

SYSTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	5	5	5	5	5	7
REQ STOP:	18	18	18	18	18	18	18

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	21,700
CFM-CLG:	21,700
%OA:	20%
%Area:	75%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,740	3,360
HTG HRS ON:	2,784	5,376
H/C HRS ON:	4,536	8,760
CLG HRS SAVED:	1,620	
HTG HRS SAVED:	2,592	
C/H HRS SAVED:	4,224	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 8063

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	40,797.72	520.58	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	23,921.04	142.86	
Sub Total	14.19	66,840.25	663.44	
Economizer	0.00	7,757.11	0.00	
Ventilation/Recirculation	0.00	824.67	37.59	
DDC Control	0.00	17,719.29	56.19	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	14.19	93,141.32	757.22	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8063

BUILDING NAME: ENL PERS DIN

Building UA: 3,330

CONDITIONED SQFT: 18,313

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
12	BRICK AND CMU	MESS HALL - KITCHEN ARE	0500-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	5	5	5	5	5	7
REQ STOP:	18	18	18	18	18	18	18

INPUTS

Motor HP:	30.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	41,000
CFM-CLG:	0
%OA:	100%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,740	3,360
HTG HRS ON:	2,784	5,376
H/C HRS ON:	4,536	8,760
CLG HRS SAVED:	1,620	
HTG HRS SAVED:	2,592	
C/H HRS SAVED:	4,224	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM

BLDG: 8063

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	53,526.15	0.00	
Opt ST/SP	0.00	6,298.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	26.33	0.00	0.00	
Night Setback	0.00	0.00	825.84	
Sub Total	26.33	59,824.55	825.84	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	8.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	26.33	59,824.55	833.87	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM

ENERGY CALCULATION PARAMETERS

BLDG: 8063

BUILDING NAME: ENL PERS DIN

Building UA: 3,330

CONDITIONED SQFT: 18,313

SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
11	BRICK AND CMU	MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	5	5	5	5	5	7
REQ STOP:	18	18	18	18	18	18	18

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,740	3,360
HTG HRS ON:	2,784	5,376
H/C HRS ON:	4,536	8,760
CLG HRS SAVED:	1,620	
HTG HRS SAVED:	2,592	
C/H HRS SAVED:	4,224	

CONSTANTS

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 8063

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,479.02	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	2,945.74	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.17	2,945.74	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

**BUILDING 8065
CLINIC W/O BEDS**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8065 BUILDING NAME: CLINIC W/O BEDS
Building UA: 1,597 CONDITIONED SQFT: 3,848

SYSTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
10 BRICK AND CMU DENTAL CLINIC 0800-1700 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	3,000
CFM-CLG:	3,000
%OA:	32%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8065

BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,091.56	296.52	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,639.58	57.49	
Sub Total	0.00	24,422.36	354.01	
Economizer	0.00	2,440.29	0.00	
Ventilation/Recirculation	0.00	354.29	14.70	
DDC Control	0.00	930.75	64.36	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	0.00	28,147.69	433.07	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8065

BUILDING NAME: CLINIC W/O BEDS

Building UA: 1,597

CONDITIONED SQFT: 3,848

SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	450,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8065

BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,778.25	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,244.98	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,244.98	2.55	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8065

BUILDING NAME: CLINIC W/O BEDS

Building UA: 1,597

CONDITIONED SQFT: 3,848

SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8065**BUILDING NAME: CLINIC W/O BEDS****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,611.41	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	4,078.13	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.17	4,078.13	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

BUILDING 8069
INDOOR SWIMMING POOL/GYM

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,190
CFM-CLG:	5,190
%OA:	5%
%Area:	9%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069**BUILDING NAME: IN SW POOL/GYM****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,531.78	24.60	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	14,997.57	127.49	
Sub Total	4.62	26,220.58	152.09	
Economizer	0.00	181.94	0.00	
Ventilation/Recirculation	0.00	16.86	1.65	
DDC Control	0.00	313.46	3.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	26,732.84	157.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8069****BUILDING NAME: IN SW POOL/GYM**

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,125
CFM-CLG:	2,125
%OA:	5%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN.AMS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,590.52	10.07	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	6,140.62	56.66	
Sub Total	2.47	12,100.11	66.73	
Economizer	0.00	74.49	0.00	
Ventilation/Recirculation	0.00	6.90	0.68	
DDC Control	0.00	128.34	1.47	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	12,309.85	68.88	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	12	6	9
REQ STOP:	20	22	22	22	22	22	20

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	1,000,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,920	3,360
HTG HRS ON:	3,072	5,376
H/C HRS ON:	5,006	8,760
CLG HRS SAVED:	1,440	
HTG HRS SAVED:	2,304	
C/H HRS SAVED:	3,754	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DCCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN.AMS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	12,409.99	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	14,052.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.67	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	14,052.81	5.67	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvtr; Optimum start/stop control - STM-HW Cnvtr; Night setback - STM-HW Cnvtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	7.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760

CLG HRS SAVED:	1,740
HTG HRS SAVED:	2,784
C/H HRS SAVED:	4,536

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN.AMS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,589.04	0.00	
Opt ST/SP	0.00	1,856.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.66	12,445.17	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.66	12,445.17	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA: 3,333

CONDITIONED SQFT: 25,620

SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069**BUILDING NAME: IN SW POOL/GYM****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	CWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	786.69	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.35	924.59	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.35	924.59	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8069****BUILDING NAME: IN SW POOL/GYM****Building UA: 3,333****CONDITIONED SQFT: 25,620****SYSTEM INFORMATION**

System Type:	26
System Name:	Pump
System Number:	CWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN.AMS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	CWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	786.69	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.35	924.59	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.35	924.59	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	12	6	9
REQ STOP:	20	22	22	22	22	22	20

INPUTS

Motor HP:	10.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	9,000
CFM-CLG:	0
%OA:	50%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,920	3,360
HTG HRS ON:	3,072	5,376
H/C HRS ON:	5,006	8,760
CLG HRS SAVED:	1,440	
HTG HRS SAVED:	2,304	
C/H HRS SAVED:	3,754	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN.AMS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	16,850.82	104.51	
Opt ST/SP	0.00	2,230.69	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	59.49	
Sub Total	0.00	19,081.51	164.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.84	
DDC Control	0.00	0.00	1.54	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	19,081.51	179.38	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	12	6	9
REQ STOP:	20	22	22	22	22	22	20

INPUTS

Motor HP:	10.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	9,000
CFM-CLG:	0
%OA:	50%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,920	3,360
HTG HRS ON:	3,072	5,376
H/C HRS ON:	5,006	8,760
CLG HRS SAVED:	1,440	
HTG HRS SAVED:	2,304	
C/H HRS SAVED:	3,754	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069**BUILDING NAME: IN SW POOL/GYM****ENERGY CALCULATION SUMMARY**

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HRU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	16,850.82	104.51	
Opt ST/SP	0.00	2,230.69	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	59.49	
Sub Total	0.00	19,081.51	164.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.84	
DDC Control	0.00	0.00	1.54	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	19,081.51	179.38	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA: 3,333

CONDITIONED SQFT: 25,620

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,750
CFM-CLG:	0
%OA:	20%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069**BUILDING NAME: IN SW POOL/GYM****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,309.46	126.28	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	141.65	
Sub Total	0.00	7,000.69	267.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.83	
DDC Control	0.00	0.00	3.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	7,000.69	285.44	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,750
CFM-CLG:	0
%OA:	20%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN.AMS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,309.46	126.28	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	141.65	
Sub Total	0.00	7,000.69	267.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.83	
DDC Control	0.00	0.00	3.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	7,000.69	285.44	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,750
CFM-CLG:	0
%OA:	20%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN.AMS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,309.46	126.28	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	141.65	
Sub Total	0.00	7,000.69	267.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.83	
DDC Control	0.00	0.00	3.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	7,000.69	285.44	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,750
CFM-CLG:	0
%OA:	20%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN.AMS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,309.46	126.28	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	141.65	
Sub Total	0.00	7,000.69	267.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	13.83	
DDC Control	0.00	0.00	3.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	7,000.69	285.44	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8069

BUILDING NAME: IN SW POOL/GYM

Building UA:	3,333	CONDITIONED SQFT:	25,620
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HV-9

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F, SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	6.50
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069**BUILDING NAME: IN SW POOL/GYM****ENERGY CALCULATION SUMMARY**

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	HV-9

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	13,234.92	748.34	
Opt ST/SP	0.00	1,449.95	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	184.15	
Sub Total	0.00	14,684.86	932.49	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	4.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	14,684.86	937.25	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8069****BUILDING NAME: IN SW POOL/GYM****Building UA: 3,333****CONDITIONED SQFT: 25,620****SYSTEM INFORMATION**

System Type:	27
System Name:	Perimeter radiation valve
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN.AMS

BLDG: 8069**BUILDING NAME: IN SW POOL/GYM****ENERGY CALCULATION SUMMARY**

System Type:	27
System Name:	Perimeter radiation valve
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
TOTAL:		0	1	0	1	\$456.00

BUILDING 8071
REGIMENTAL HQ BUILDING

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8071	BUILDING NAME: RGT HQ BUILD
Building UA: 2,545	CONDITIONED SQFT: 9,963

SYSTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	12,450
CFM-CLG:	12,450
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/CWW

BLDG: 8071

BUILDING NAME: RGT HQ BUILD

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	44,766.19	124.10	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	72,083.49	93.15	
Sub Total	14.19	118,971.18	217.24	
Economizer	0.00	2,580.48	0.00	
Ventilation/Recirculation	0.00	97.59	6.15	
DDC Control	0.00	7,562.93	76.60	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	14.19	129,212.18	300.00	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 8071****BUILDING NAME: RGT HQ BUILD**

Building UA:	2,545	CONDITIONED SQFT:	9,963
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	CWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7.BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 8071**BUILDING NAME: RGT HQ BUILD****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	CWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,035.33	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.66	2,298.37	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.66	2,298.37	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

**BUILDING 8100
CONSOLIDATED MAINTENANCE**

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	795
%OA:	10%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	500.02	0.00	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.11	0.00	0.00	
Night Setback	0.00	4,869.69	0.00	
Sub Total	0.11	5,415.22	0.00	
Economizer	0.00	150.26	0.00	
Ventilation/Recirculation	0.00	16.49	0.00	
DDC Control	0.00	440.75	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.11	6,022.71	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-11

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,350
CFM-CLG:	0
%OA:	30%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-11

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,761.50	72.42	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	28.65	
Sub Total	0.00	5,130.46	101.08	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	5.61	
DDC Control	0.00	0.00	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,130.46	130.25	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-12

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	0
%OA:	20%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-12

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,920.27	82.18	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	28.65	
Sub Total	0.00	9,611.50	110.84	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	6.37	
DDC Control	0.00	0.00	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,611.50	140.77	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 8100****BUILDING NAME: CONSOLIDATED MNT**

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-13

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	19,760
CFM-CLG:	0
%OA:	20%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-13

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	405.99	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	114.61	
Sub Total	0.00	29,499.17	520.59	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	31.46	
DDC Control	0.00	0.00	94.25	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	29,499.17	646.31	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA: 78,283

CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-14

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	14,780
CFM-CLG:	0
%OA:	35%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-14

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	531.42	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.30	
Sub Total	0.00	29,499.17	588.72	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	41.18	
DDC Control	0.00	0.00	47.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	29,499.17	677.03	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 8100****BUILDING NAME: CONSOLIDATED MNT**

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-15

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	23,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-15

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	221.46	
Sub Total	0.00	100,551.65	221.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	95.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	100,551.65	316.81	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-16

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	8.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,000
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-16

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	23,029.46	0.00	
Opt ST/SP	0.00	1,784.55	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	0.00	24,814.01	147.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	63.57	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	24,814.01	211.21	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-17

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	23,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-17

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	221.46	
Sub Total	0.00	100,551.65	221.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	95.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	100,551.65	316.81	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA: 78,283

CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-18

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	17.50
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	12,420
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-18

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	47,910.94	0.00	
Opt ST/SP	0.00	3,712.61	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	0.00	51,623.55	147.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	63.57	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	51,623.55	211.21	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-19

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	23,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-19

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	221.46	
Sub Total	0.00	100,551.65	221.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	95.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	100,551.65	316.81	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA: 78,283

CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	600
%OA:	10%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	467.40	0.00	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.11	0.00	0.00	
Night Setback	0.00	3,675.24	0.00	
Sub Total	0.11	4,188.15	0.00	
Economizer	0.00	113.40	0.00	
Ventilation/Recirculation	0.00	12.44	0.00	
DDC Control	0.00	332.64	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.11	4,646.63	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-20

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	23,000
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-20

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	221.46	
Sub Total	0.00	100,551.65	221.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	95.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	100,551.65	316.81	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-21

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	18.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	6,000
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-21

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	48,768.27	0.00	
Opt ST/SP	0.00	3,779.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	0.00	52,547.31	147.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	63.57	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	52,547.31	211.21	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 8100****BUILDING NAME: CONSOLIDATED MNT**

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-22

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	25.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	15,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-22

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	67,733.70	0.00	
Opt ST/SP	0.00	5,248.67	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	295.28	
Sub Total	0.00	72,982.38	295.28	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	127.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	72,982.38	422.42	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 BUILDING NAME: CONSOLIDATED MNT
Building UA: 78,283 CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type: 17
System Name: Heating and Ventilating Unit with Return Fa
System Number: AHU-23

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	35.00
HP Effci:	0.88
Load Factor:	0.80
CFM-HTG:	25,000
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	17
System Name:	Heating and Ventilating Unit with Return Fa
System Number:	AHU-23

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	93,320.28	0.00	
Opt ST/SP	0.00	7,231.37	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	295.28	
Sub Total	0.00	100,551.65	295.28	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	127.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	100,551.65	422.42	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		2	2	0	5	\$1,782.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 8100****BUILDING NAME: CONSOLIDATED MNT**

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-24

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	35,200
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-24

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	53,325.88	0.00	
Opt ST/SP	0.00	4,132.21	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	57,458.09	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	253.64	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	57,458.09	253.64	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100 BUILDING NAME: CONSOLIDATED MNT
Building UA: 78,283 CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: AHU-24(2)

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	35,200
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-24(2)

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	53,325.88	0.00	
Opt ST/SP	0.00	4,132.21	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	57,458.09	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	253.64	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	57,458.09	253.64	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA: 78,283

CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-25

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,500
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-25

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,393.41	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,508.75	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	101.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,508.75	101.45	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA: 78,283

CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-26

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	19,600
CFM-CLG:	0
%OA:	100%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DCCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-26

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	40,640.22	0.00	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	43,789.43	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	152.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	43,789.43	152.18	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-27

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	1,000
CFM-CLG:	0
%OA:	100%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	AHU-27

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,393.41	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,508.75	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	50.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,508.75	50.73	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	600
%OA:	10%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	467.40	0.00	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.11	0.00	0.00	
Night Setback	0.00	3,675.24	0.00	
Sub Total	0.11	4,188.15	0.00	
Economizer	0.00	113.40	0.00	
Ventilation/Recirculation	0.00	12.44	0.00	
DDC Control	0.00	332.64	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.11	4,646.63	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	1,000
%OA:	10%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	534.31	0.00	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.11	0.00	0.00	
Night Setback	0.00	6,125.40	0.00	
Sub Total	0.11	6,705.22	0.00	
Economizer	0.00	189.00	0.00	
Ventilation/Recirculation	0.00	20.74	0.00	
DDC Control	0.00	554.40	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.11	7,469.36	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	725
CFM-CLG:	725
%OA:	10%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,076.41	7.53	
Opt ST/SP	0.00	45.51	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.30	0.00	0.00	
Night Setback	0.00	4,375.50	28.65	
Sub Total	0.30	5,497.41	36.18	
Economizer	0.00	135.24	0.00	
Ventilation/Recirculation	0.00	5.68	0.36	
DDC Control	0.00	396.37	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.30	6,034.71	60.11	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 8100****BUILDING NAME: CONSOLIDATED MNT**

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	12,045
CFM-CLG:	12,045
%OA:	40%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	74,163.24	500.59	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	21.06	0.00	0.00	
Night Setback	0.00	72,693.63	85.95	
Sub Total	21.06	150,006.08	586.54	
Economizer	0.00	2,246.89	0.00	
Ventilation/Recirculation	0.00	377.66	23.81	
DDC Control	0.00	6,585.22	70.69	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	21.06	159,215.84	681.04	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	4	1	14	\$4,826.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA: 78,283

CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	3,790
CFM-CLG:	3,790
%OA:	10%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	24,078.25	39.38	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	22,873.30	28.65	
Sub Total	7.46	48,066.89	68.03	
Economizer	0.00	706.99	0.00	
Ventilation/Recirculation	0.00	29.71	1.87	
DDC Control	0.00	2,072.06	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	50,875.65	93.47	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-8

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,295
CFM-CLG:	6,295
%OA:	50%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	39,733.29	327.02	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	37,991.40	28.65	
Sub Total	10.99	79,367.50	355.68	
Economizer	0.00	1,174.28	0.00	
Ventilation/Recirculation	0.00	246.72	15.55	
DDC Control	0.00	3,441.59	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	84,230.08	394.79	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	4	1	14	\$4,826.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-9

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	0
%OA:	40%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-9

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,200.40	328.73	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	28.65	
Sub Total	0.00	22,843.22	357.39	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	25.47	
DDC Control	0.00	0.00	23.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	22,843.22	406.42	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA: 78,283

CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	6,278,000
BLR CAP OUTPUT (BTUH):	5,021,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,917.45	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	35.60	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	1,917.45	35.60	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	6,278,000
BLR CAP OUTPUT (BTUH):	5,021,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,917.45	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	35.60	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	1,917.45	35.60	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.52	52.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.52	52.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.52	52.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA: 78,283

CONDITIONED SQFT: 224,927

SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,764.43	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	4,231.16	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	525.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.25	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	26.42	4,756.16	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 8100****BUILDING NAME: CONSOLIDATED MNT****Building UA: 78,283****CONDITIONED SQFT: 224,927****SYSTEM INFORMATION**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-7

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	262.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.62	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	12.62	262.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-8

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (Tons):	24
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,764.43	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	4,231.16	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	420.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	20.20	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	21.37	4,651.16	0.00	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
TOTAL:		2	0	3	2	\$1,481.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	29,499.17	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	29,499.17	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	HWP-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	29,499.17	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	29,499.17	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	26
System Name:	Pump
System Number:	HWP-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,200.40	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	22,843.22	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	22,843.22	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	HWP-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	40,640.22	0.00	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	43,789.43	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	43,789.43	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS**BLDG: 8100****BUILDING NAME: CONSOLIDATED MNT**

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CVWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	HWP-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	40,640.22	0.00	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	43,789.43	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	43,789.43	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.90
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	12,440
CFM-CLG:	0
%OA:	0%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,303.29	0.00	
Opt ST/SP	0.00	255.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	369.10	
Sub Total	0.00	3,559.26	369.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	3,559.26	369.10	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	38,674
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,920.27	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	590.57	
Sub Total	0.00	9,611.50	590.57	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	9,611.50	590.57	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	6.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	76,800
CFM-CLG:	0
%OA:	0%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	21
System Name:	HW Unit heater
System Number:	UH-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	22,021.92	0.00	
Opt ST/SP	0.00	1,706.48	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	885.85	
Sub Total	0.00	23,728.40	885.85	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	23,728.40	885.85	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.90
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	32,212
CFM-CLG:	0
%OA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	21
System Name:	HW Unit heater
System Number:	UH-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,303.29	0.00	
Opt ST/SP	0.00	255.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	442.93	
Sub Total	0.00	3,559.26	442.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	3,559.26	442.93	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	1.80
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	20,600
CFM-CLG:	0
%OA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,606.58	0.00	
Opt ST/SP	0.00	511.94	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	442.93	
Sub Total	0.00	7,118.52	442.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	7,118.52	442.93	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	2.40
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	7,730
CFM-CLG:	0
%OA:	0%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	21
System Name:	HW Unit heater
System Number:	UH-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,808.77	0.00	
Opt ST/SP	0.00	682.59	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	0.00	9,491.36	147.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	9,491.36	147.64	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-7

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	8,650
CFM-CLG:	0
%OA:	0%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100**BUILDING NAME: CONSOLIDATED MNT****ENERGY CALCULATION SUMMARY**

System Type:	21
System Name:	HW Unit heater
System Number:	UH-7

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,669.32	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	147.64	
Sub Total	0.00	2,876.17	147.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	2,876.17	147.64	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

ENERGY CALCULATION PARAMETERS

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

Building UA:	78,283	CONDITIONED SQFT:	224,927
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-8

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS

Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	2,324
CFM-CLG:	0
%OA:	0%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/CWW

BLDG: 8100

BUILDING NAME: CONSOLIDATED MNT

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	903.46	0.00	
Opt ST/SP	0.00	70.01	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	73.82	
Sub Total	0.00	973.47	73.82	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	973.47	73.82	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8300
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/JM/AMS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	58.10	
Sub Total	0.00	3,685.15	58.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	25.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,685.15	83.11	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,801

CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/JM/AMS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.80	
Sub Total	0.00	1,931.91	49.80	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	71.24	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.89	
Sub Total	0.00	5,169.18	107.89	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	46.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169.18	154.34	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8300****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	28.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/JM/AMS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	28.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,015.58	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	57.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,015.58	57.03	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	199.18	
Sub Total	0.00	1,931.91	199.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,931.91	199.18	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8300

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/JM/AMS

BLDG: 8300**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	132.79	
Sub Total	0.00	1,294.68	132.79	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	132.79	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8320
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,801

CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	58.10	
Sub Total	0.00	3,685.15	58.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	25.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,685.15	83.11	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 8,801 CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.80	
Sub Total	0.00	1,931.91	49.80	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	71.24	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.89	
Sub Total	0.00	5,169.18	107.89	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	46.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169.18	154.34	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	28.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,801

CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	28.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,801

CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,015.58	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	57.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,015.58	57.03	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	199.18	
Sub Total	0.00	1,931.91	199.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,931.91	199.18	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8320

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8320**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	132.79	
Sub Total	0.00	1,294.68	132.79	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	132.79	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8330
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	8
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	140.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	6.73	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	6.73	140.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,445
CFM-CLG:	3,455
%OA:	10%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,637.16	36.67	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	21,360.09	93.71	
Sub Total	3.12	32,463.97	130.38	
Economizer	0.00	601.53	0.00	
Ventilation/Recirculation	0.00	27.08	1.70	
DDC Control	0.00	1,762.98	77.07	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	34,855.57	209.14	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	20.00
HP Effic:	0.76
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,898,000
BLR CAP OUTPUT (BTUH):	2,318,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	63,281.99	0.00	
Opt ST/SP	0.00	4,786.96	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	68,068.94	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	16.43	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	68,068.94	16.43	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 17,069

CONDITIONED SQFT: 39,256

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,420
CFM-CLG:	0
%OA:	32%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	115.17	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	62.47	
Sub Total	0.00	6,636.72	177.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	8.71	
DDC Control	0.00	0.00	51.38	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,636.72	237.73	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330 BUILDING NAME: VEH MNT SHOP ORG
 Building UA: 17,069 CONDITIONED SQFT: 39,256

SYSTEM INFORMATION

System Type: 26
 System Name: Pump
 System Number: HWP-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32
 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	26
System Name:	Pump
System Number:	HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
TOTAL:		1	0	1	0	\$386.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8330****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	17,069	CONDITIONED SQFT:	39,256
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,960
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAHC:	0
HOAOH:	0
COAHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,636.72	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	55.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,636.72	55.30	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,755
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,636.72	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	55.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,636.72	55.30	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,069	CONDITIONED SQFT:	39,256
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.70
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	22,000
CFM-CLG:	0
%OA:	0%
%Area:	30%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,391.73	0.00	
Opt ST/SP	0.00	483.50	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	482.88	
Sub Total	0.00	6,875.23	482.88	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	6,875.23	482.88	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8330****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	17,069	CONDITIONED SQFT:	39,256
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	26,400
CFM-CLG:	0
%OA:	0%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8330

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	563.36	
Sub Total	0.00	6,636.72	563.36	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	6,636.72	563.36	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8340
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	58.10	
Sub Total	0.00	3,685.15	58.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	25.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,685.15	83.11	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0.000105
NSUC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,801

CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	41.50	
Sub Total	0.00	1,931.91	41.50	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	17.87	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	59.36	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	49.80	
Sub Total	0.00	1,931.91	49.80	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	71.24	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,801

CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: AJN/AMS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.89	
Sub Total	0.00	5,169.18	107.89	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	46.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169.18	154.34	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 8,801

CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	28.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	28.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	28.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,372.77	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,015.58	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	57.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,015.58	57.03	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340	BUILDING NAME: VEH MNT SHOP ORG
Building UA: 8,801	CONDITIONED SQFT: 20,240

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	199.18	
Sub Total	0.00	1,931.91	199.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,931.91	199.18	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8340

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	8,801	CONDITIONED SQFT:	20,240
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 8340**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	132.79	
Sub Total	0.00	1,294.68	132.79	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	132.79	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8360
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7.BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	7
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	ACCU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	122.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	5.89	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	5.89	122.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360	BUILDING NAME: VEH MNT SHOP ORG
Building UA: 17,691	CONDITIONED SQFT: 39,428

SYSTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	2,460
CFM-CLG:	2,460
%OA:	20%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	50.54	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	25.90	
Sub Total	0.00	6,489.82	76.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	3.92	
DDC Control	0.00	0.00	21.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	0.00	6,489.82	101.66	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
TOTAL:		1	8	1	11	\$4,509.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8360****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	17,691	CONDITIONED SQFT:	39,428
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	5,537,500
BLR CAP OUTPUT (BTUH):	4,430,000

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	27,377.68	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	29,499.17	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	31.40	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	29,499.17	31.40	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,270
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,761.50	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	0.00	5,130.46	83.41	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,130.46	119.33	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	6,660
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	0.00	6,489.82	83.41	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,489.82	119.33	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 17,691

CONDITIONED SQFT: 39,428

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	6,490
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	0.00	6,489.82	83.41	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,489.82	119.33	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,870
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	0.00	6,489.82	83.41	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,489.82	119.33	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	17,691	CONDITIONED SQFT:	39,428
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,360
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-5

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	83.41	
Sub Total	0.00	6,489.82	83.41	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	35.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,489.82	119.33	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8360****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	17,691	CONDITIONED SQFT:	39,428
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	9,540
CFM-CLG:	0
%OA:	100%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,920.27	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	100.10	
Sub Total	0.00	9,611.50	100.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	43.10	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,611.50	143.19	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 17,691

CONDITIONED SQFT: 39,428

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	600.57	
Sub Total	0.00	1,917.45	600.57	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,917.45	600.57	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8360

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 17,691

CONDITIONED SQFT: 39,428

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8360**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,192.57	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	400.38	
Sub Total	0.00	1,284.98	400.38	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,284.98	400.38	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8370
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,180
CFM-CLG:	2,180
%OA:	10%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,316.02	23.20	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	13,477.57	59.88	
Sub Total	2.47	22,162.55	83.08	
Economizer	0.00	379.55	0.00	
Ventilation/Recirculation	0.00	17.09	1.08	
DDC Control	0.00	1,112.39	49.24	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	23,671.57	133.40	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 11,686

CONDITIONED SQFT: 26,876

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,750
CFM-CLG:	1,750
%OA:	28%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,493.51	52.15	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	10,819.15	55.60	
Sub Total	1.76	17,575.70	107.75	
Economizer	0.00	304.68	0.00	
Ventilation/Recirculation	0.00	38.41	2.42	
DDC Control	0.00	892.97	45.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	18,811.76	155.90	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.21	87.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.21	87.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876
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SYSTEM INFORMATION

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	400,000
BLR CAP OUTPUT (BTUH):	400,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	5
System Name:	Steam to hot water converter
System Number:	CV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	9,829.07	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.27	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,829.07	2.27	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
TOTAL:		1	1	1	3	\$1,495.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,900
CFM-CLG:	0
%OA:	10%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,477.31	30.52	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.16	
Sub Total	0.00	3,740.35	94.67	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	2.31	
DDC Control	0.00	0.00	52.76	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,740.35	149.75	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8370****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	11,686	CONDITIONED SQFT:	26,876
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,000
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-2

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,477.31	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	143.26	
Sub Total	0.00	3,740.35	143.26	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	61.68	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,740.35	204.94	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	11,686	CONDITIONED SQFT:	26,876
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	6,240
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,169.99	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,636.72	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	37.86	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,636.72	37.86	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 11,686

CONDITIONED SQFT: 26,876

SYSTEM INFORMATION

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	40%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8370

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,822.95	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	440.80	
Sub Total	0.00	1,960.85	440.80	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,960.85	440.80	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8380
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,400

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,100
CFM-CLG:	2,100
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,302.51	22.35	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,982.98	11.59	
Sub Total	2.47	21,654.45	33.94	
Economizer	0.00	365.62	0.00	
Ventilation/Recirculation	0.00	16.46	1.04	
DDC Control	0.00	1,071.57	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	23,108.10	44.51	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,520
CFM-CLG:	1,520
%OA:	5%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,182.11	8.09	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	9,397.20	5.80	
Sub Total	3.12	20,046.04	13.88	
Economizer	0.00	264.64	0.00	
Ventilation/Recirculation	0.00	5.96	0.38	
DDC Control	0.00	775.61	4.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	21,092.25	19.03	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7.BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,100
CFM-CLG:	2,100
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,302.51	22.35	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,982.98	11.59	
Sub Total	2.47	21,654.45	33.94	
Economizer	0.00	365.62	0.00	
Ventilation/Recirculation	0.00	16.46	1.04	
DDC Control	0.00	1,071.57	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	23,108.10	44.51	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,245
CFM-CLG:	2,245
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,326.99	23.89	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	13,879.42	11.59	
Sub Total	2.47	22,575.38	35.48	
Economizer	0.00	390.87	0.00	
Ventilation/Recirculation	0.00	17.60	1.11	
DDC Control	0.00	1,145.56	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	24,129.40	46.13	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,400

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,305
CFM-CLG:	2,305
%OA:	5%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,142.52	12.27	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	14,250.36	11.59	
Sub Total	2.47	22,761.85	23.86	
Economizer	0.00	401.31	0.00	
Ventilation/Recirculation	0.00	9.03	0.57	
DDC Control	0.00	1,176.17	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	24,348.37	33.96	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	15,650
CFM-CLG:	0
%OA:	10%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	67,836.96	166.57	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	21.06	0.00	0.00	
Night Setback	0.00	0.00	34.77	
Sub Total	21.06	70,986.16	201.34	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	7.73	
DDC Control	0.00	0.00	28.60	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	21.06	70,986.16	237.67	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	13,980
CFM-CLG:	0
%OA:	5%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JM/AJN/AMS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	45,699.02	74.40	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	28.98	
Sub Total	14.19	47,820.51	103.37	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	3.45	
DDC Control	0.00	0.00	23.83	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	14.19	47,820.51	130.66	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.21	87.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.52	52.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,400

SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	6
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	96.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.63	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.63	96.25	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.21	87.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DCCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8380****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	41.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	41.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	9,829.07	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,829.07	20.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAHC:	0
HOAOH:	0
COAHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	9,829.07	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,829.07	20.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	9,600
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	41.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	9,600
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	41.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-7

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,859.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,859.81	20.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-8

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,859.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,859.81	20.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	0.00	1,314.07	209.04	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8380****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAHC:	0
HOAOH:	0
COAHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	0.00	1,314.07	209.04	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	0.00	1,314.07	209.04	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8380

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,400
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8380**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	0.00	1,314.07	209.04	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8390
TACTICAL EQUIPMENT SHOP

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

Building UA: 10,764 CONDITIONED SQFT: 24,755

SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	3,475
CFM-CLG:	3,475
%OA:	10%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390**BUILDING NAME: TAC EQUIP SHOP****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	13,879.75	33.17	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	19,267.16	47.28	
Sub Total	4.62	33,838.14	80.45	
Economizer	0.00	792.28	0.00	
Ventilation/Recirculation	0.00	27.24	1.72	
DDC Control	0.00	2,322.03	38.88	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	36,979.69	121.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755
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SYSTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,250,000
BLR CAP OUTPUT (BTUH):	2,600,000

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390**BUILDING NAME: TAC EQUIP SHOP****ENERGY CALCULATION SUMMARY**

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

FUNCTION	KW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	37,336.14	0.00	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	40,485.34	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	18.43	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	40,485.34	18.43	4.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
TOTAL:		2	0	2	3	\$1,443.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	8
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390**BUILDING NAME: TAC EQUIP SHOP****ENERGY CALCULATION SUMMARY**

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	0.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	140.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	6.73	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	6.73	140.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,345
CFM-CLG:	0
%OA:	33%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,374.38	104.18	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	47.28	
Sub Total	0.00	4,743.35	151.45	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	8.79	
DDC Control	0.00	0.00	38.88	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,743.35	199.12	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

Building UA: 10,764

CONDITIONED SQFT: 24,755

SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,700
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,374.38	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	4,743.35	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	69.75	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,743.35	69.75	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8390****BUILDING NAME: TAC EQUIP SHOP**

Building UA:	10,764	CONDITIONED SQFT:	24,755
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,700
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,374.38	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	4,743.35	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	69.75	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,743.35	69.75	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755
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SYSTEM INFORMATION

System Type:	27
System Name:	Perimeter radiation valve
System Number:	RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	27
System Name:	Perimeter radiation valve
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
TOTAL:		0	1	0	1	\$456.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390 BUILDING NAME: TAC EQUIP SHOP
Building UA: 10,764 CONDITIONED SQFT: 24,755

SYSTEM INFORMATION

System Type: 21
System Name: HW Unit heater
System Number: UH-1

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	0%
%Area:	23%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,118.54	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	233.46	
Sub Total	0.00	3,381.58	233.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	3,381.58	233.46	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8390

BUILDING NAME: TAC EQUIP SHOP

Building UA:	10,764	CONDITIONED SQFT:	24,755
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SYSTEM INFORMATION

System Type:	21
System Name:	HW Unit heater
System Number:	UH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	0%
%Area:	23%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 8390**BUILDING NAME: TAC EQUIP SHOP****ENERGY CALCULATION SUMMARY**

System Type: 21
System Name: HW Unit heater
System Number: UH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,118.54	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	233.46	
Sub Total	0.00	3,381.58	233.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	3,381.58	233.46	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

BUILDING 8410
VEHICLE MAINTENANCE SHOP ORG

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
 Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 15
 System Name: Small Single Zone air handling unit
 System Number: AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
 7.BRICK AND CMU BATTALION 0700-1800 M-F, SAT
 Weeks of Winter: 32
 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,100
CFM-CLG:	2,100
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,302.51	22.35	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,982.98	11.59	
Sub Total	2.47	21,654.45	33.94	
Economizer	0.00	365.62	0.00	
Ventilation/Recirculation	0.00	16.46	1.04	
DDC Control	0.00	1,071.57	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	23,108.10	44.51	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	1,520
CFM-CLG:	1,520
%OA:	5%
%Area:	1%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,182.11	8.09	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	9,397.20	5.80	
Sub Total	3.12	20,046.04	13.88	
Economizer	0.00	264.64	0.00	
Ventilation/Recirculation	0.00	5.96	0.38	
DDC Control	0.00	775.61	4.77	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	21,092.25	19.03	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-3

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
7 BRICK AND CMU BATTALION 0700-1800 M-F, SAT
Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,100
CFM-CLG:	2,100
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,302.51	22.35	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	12,982.98	11.59	
Sub Total	2.47	21,654.45	33.94	
Economizer	0.00	365.62	0.00	
Ventilation/Recirculation	0.00	16.46	1.04	
DDC Control	0.00	1,071.57	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	23,108.10	44.51	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,245
CFM-CLG:	2,245
%OA:	10%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,326.99	23.89	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	13,879.42	11.59	
Sub Total	2.47	22,575.38	35.48	
Economizer	0.00	390.87	0.00	
Ventilation/Recirculation	0.00	17.60	1.11	
DDC Control	0.00	1,145.56	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	24,129.40	46.13	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,305
CFM-CLG:	2,305
%OA:	5%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,142.52	12.27	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	14,250.36	11.59	
Sub Total	2.47	22,761.85	23.86	
Economizer	0.00	401.31	0.00	
Ventilation/Recirculation	0.00	9.03	0.57	
DDC Control	0.00	1,176.17	9.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	24,348.37	33.96	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233
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SYSTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	15,650
CFM-CLG:	0
%OA:	10%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
 CLIENT CNTRCT #: DACA 01-94-D-0033
 LOCATION: FT. RILEY, KS

EMC NO: 1406-001
 DATE: 16-Sep-95
 PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	67,836.96	166.57	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	21.06	0.00	0.00	
Night Setback	0.00	0.00	34.77	
Sub Total	21.06	70,986.16	201.34	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	7.73	
DDC Control	0.00	0.00	28.60	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	21.06	70,986.16	237.67	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8410****BUILDING NAME: VEH MNT SHOP ORG****Building UA: 15,834****CONDITIONED SQFT: 73,233****SYSTEM INFORMATION**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	13,980
CFM-CLG:	0
%OA:	5%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	45,699.02	74.40	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	0.00	75.34	
Sub Total	14.19	47,820.51	149.74	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	3.45	
DDC Control	0.00	0.00	61.96	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	14.19	47,820.51	215.15	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
TOTAL:		1	3	0	6	\$2,116.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7.BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.21	87.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.52	52.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	6
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-3

FUNCTION	KW/yr	KWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	96.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.63	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.63	96.25	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS**BLDG: 8410****BUILDING NAME: VEH MNT SHOP ORG**

Building UA:	15,834	CONDITIONED SQFT:	73,233
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SYSTEM INFORMATION

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7/BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.21	87.50	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.37	70.00	0.00	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
TOTAL:		1	0	1	0	\$243.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
14/METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	41.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	11,200
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	41.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	9,829.07	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,829.07	20.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-4

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	100%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: i6-Sep-95

PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-4

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	9,829.07	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,829.07	20.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233
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SYSTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	9,600
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-5

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	41.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-6

TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	9,600
CFM-CLG:	0
%OA:	100%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-6

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	21,717.49	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	23,360.30	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	41.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	23,360.30	41.04	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410	BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834	CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-7

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,400
CFM-CLG:	0
%OA:	100%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-7

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,859.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	61.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,859.81	61.56	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-8

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
14 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP: 5.00
HP Effic: 0.82
Load Factor: 0.80
CFM-HTG: 6,400
CFM-CLG: 0
%OA: 100%
%Area: 2%
CHILLER CAP (TONS): 0
KW-TON: 0.00
BLR CAP INPUT (BTUH): 0
BLR CAP OUTPUT (BTUH): 0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-8

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,744.47	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	15,859.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	20.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	15,859.81	20.52	3.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
TOTAL:		1	2	0	4	\$1,433.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-1

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMC

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	0.00	1,314.07	209.04	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410 BUILDING NAME: VEH MNT SHOP ORG
Building UA: 15,834 CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

TYPICAL BUILDING INFORMATION

Category Number: Construction: Use: Occupancy HRS: Occupancy Days:
13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CONTACT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410**BUILDING NAME: VEH MNT SHOP ORG****ENERGY CALCULATION SUMMARY**

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	0.00	1,314.07	209.04	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA:	15,834	CONDITIONED SQFT:	73,233
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SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-3

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter:	32
Weeks of Summer:	20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	
HTG HRS SAVED:	4,032	
C/H HRS SAVED:	6,570	

CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1423-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP CRG

ENERGY CALCULATION SUMMARY

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-3

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,221.66	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	209.04	
Sub Total	0.00	1,314.07	209.04	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,314.07	209.04	0.00

TYPICAL SYSTEM POINT AND COST SUMMARY

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
TOTAL:		1	0	1	2	\$1,213.00

EMC ENGINEERS, INC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS
CLIENT CNTRCT #: DACA 01-94-D-0033
LOCATION: FT. RILEY, KS

EMC NO: 1406-001
DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

ENERGY CALCULATION PARAMETERS

BLDG: 8410

BUILDING NAME: VEH MNT SHOP ORG

Building UA: 15,834

CONDITIONED SQFT: 73,233

SYSTEM INFORMATION

System Type:	20
System Name:	Infrared Radiant Heaters
System Number:	RAD-4

TYPICAL BUILDING INFORMATION

Category Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

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COAUC:	0
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HOAOH:	0
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COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
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Chilled Water Reset	0.00	0.00	0.00	
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